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THE WILSON BULLETIN

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THE WILSON BULLETIN
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Vol. 52 MARCH, 1940 No. 1

BREEDING BEHAVIOR OF THE BLACK-THROATED GREEN WARBLER[1]

BY FRANK A. PITELKA

A nest of the Black-throated Green Warbler *(Dendroica virens)* was kept under observation for a five-week period (June 26-July 30) during the summer of 1938 near the University of Michigan Biological Station, Cheboygan County, Michigan. Original nest observations extended from the beginning of nest building to the time the young were five days out of the nest and totalled 55 hours; these are supplemented with data on a second nest and with general observations on occurrence.

Observations were made from a canvas blind built on the platform of a 16-foot tower of cedar poles. The blind was placed three feet to the side of the nest, which was 23 feet from the ground. With the aid of a foot stool, the observer could reach the nest for purposes of examining contents and removing young for weighing.

The majority of the Compsothlypidae remain relatively untouched subjects for life-history students. The Black-throated Green Warbler, while not the best known species of warbler or perhaps even of the genus *Dendroica,* has received its share of attention, this largely in general studies of birds or in somewhat casual observation. Individual treatment has been accorded it chiefly by Stanwood (1910, 1914) and particularly by the Nices (1932). Nichols (1919) has most justifiably called attention to the opportunities offered by the genus *Dendroica.*

Acknowledgments are gratefully made to Dr. Olin Sewall Pettingill, Jr., Carleton College, Northfield, Minnesota, for suggestions on nest observation and for critical reading of the manuscript, to Dr. Theodora Nelson, Hunter College of the City of New York, for helpful advice during the course of the study, and to Mrs. Margaret M. Nice for valuable suggestions and corrections of the manuscript.

Niche Relationships

During the breeding season the Black-throated Green Warbler is one of the more frequent Compsothlypids in the conifer regions of northern lower Michigan, though it is by no means to be included

[1] Contribution from the University of Michigan Biological Station.

among the common birds. Locally it occurs in spruces of mature bog communities and in upland developmental forests of mixed pine and deciduous growth. Less frequently it breeds in mature deciduous forest (Blanchard and Nelson, MS). While the niche requirements of the nesting site confine it, with few exceptions, to coniferous trees, the species forages generally in the higher levels of the prevailing vegetation—high shrubs and both deciduous and coniferous trees. It appears to be far more tolerant than such characteristic coniferous forest species as the Pine Warbler *(Dendroica pinus)* and Blue-headed Vireo *(Vireo solitarius)*, and will occupy areas that afford only a few evergreens for nesting sites (Bagg and Eliot, 1937:588).

Vegetation of this breeding habitat of *Dendroica virens* in northern Michigan may be characterized by the following chief components: coniferous trees *(Pinus resinosa* and *P. strobus*, the former being the predominant species for the community) and deciduous trees *(Populus grandidentata, P. tremuloides, Betula papyrifera,* and *Quercus borealis);* scattered high shrubs (chiefly *Amelanchier canadensis)* and ground vegetation of shrubby ericads *(Vaccinium pennsylvanicum, Gaylussacia baccata,* and *Arctostaphylos uva-ursi)* and bracken-fern *(Pteris aquilina).*

The avifauna of this pine-aspen community included the Red-eyed Vireo (*Vireo olivaceus*), Hermit Thrush (*Hylocichla guttata*), Crow *(Corvus brachyrhynchos),* Cedar Waxwing *(Bombycilla cedrorum),* Chipping Sparrow *(Spizella passerina),* Nashville Warbler *(Vermivora ruficapilla),* and Pine Warbler *(Dendroica pinus).*

Nesting Sites and Nest Building

Structure and location of nests are detailed in Table 1. Nests apparently vary according to availability of material and probably according to the skill or past experience of the female (Herrick, 1935: 222). Nest A, at which my observations were made, was poorly built (i.e., walls loose and comparatively flexible, foundation thin), and insecurely placed; nest B (obtained in Emmet County, July 4, 1938) was well built and securely placed. The late date at which nest A was started (June 26th) would suggest that it was either a second attempt at nesting or the first attempt of a yearling female.

Nichols (1919:226) maintains that nests of different species of *Dendroica* are remarkably distinct; according to his observations, the nests of Black-throated Green Warblers (in a limited area of New Brunswick) are characterized on the outside by spruce twigs and birch-bark whorls, on the inside by hair, and an occasional feather. Undoubtedly a good many nests of the Black-throated Green Warbler do not possess those characteristics or, if present, such materials may be few (see examples in Table 1). Judging by the literature (e.g., Stanwood, 1910:290–292, also 1914:187; Sutton, 1928:215) as well as my

TABLE 1

STRUCTURE OF NESTS

	Nest A	Nest B
Location	Horizontal branch of Norway Pine *(Pinus resinosa)*	Same
Height from ground	23 feet (7 meters)	12 feet (3.66 meters)
Distance from trunk	5.5 feet (1.68 meters)	5 feet (1.52 meters)
Material		
Lining	Mostly hairs; some grasses, a small black feather and wool-like plant fibers	Rootlets, blades of grass short pine twigs
Bulk	Grasses, rootlets, thin and short pine twigs	Rootlets, blades of grass short pine twigs
Trimming	Mostly birch bark; more of the wool-like plant fibers, some cottony material (from seeds?), and a piece of partially decayed leaf blade	A considerable quantity of hypnaceous mosses and bits of birch bark
Measurements*		
Inside Diameter	4.5 cm.	5.0 cm.
Outside Diameter	7.8	7.5
Inside Depth	3.0	3.0
Outside Depth		
Maximum	5.5	6.5
Minimum	3.0	3.0
Approximate Dry Weight.	4.9 grams	7.8 grams

* Nest measurements as given by Knight (1908:527) are slightly greater in diameter and inside depth, indicating a bulkier structure. His figure of 1½ in. (3.8 cm.) for inside diameter (p. 527) is doubtlessly an error.

own observations on the present species and other passerines, the materials of nest construction are relatively variable. To a large degree this variation may be explained by the simple principle of availability (McAtee, 1932:135), modified, of course, by niche and territorial limitations. Thus differences between nests A and B in materials used can easily be explained from an examination of the surrounding territory, the first being built in a dry, upland pine-aspen-birch forest, the second in a grassy pine grove bordering a *Thuja* bog where ground mosses abounded.

Nest-building lasted four days; both sexes participated at least during the first day when they were observed working the initial material together and individually. The female apparently completed the bulk of the structure. Stanwood (1910:292) likewise recorded a 4-day nest building period, the male taking part only on the first day; in a second case nest building occupied 8 days, performed entirely by the female. The interval between completion of nest and laying of the first egg was but one day in my own observations, nine days and one

day, respectively, in the two nests observed by Stanwood (1910:293). The figure of nine days seems doubtful since this makes a 13-day interval between beginning of nest-building and appearance of the first egg. Nice (1937:94) finds that in the Song Sparrow *(Melospiza melodia)* this interval is 3 to 7 days, usually 4 to 5, with exceptional records of 9 and 13 days connected with subnormally reactive females. For the White-crowned Sparrow (*Zonotrichia leucophrys*), Blanchard (MS, 1938) reports that the interval between beginning of nest building and appearance of first egg is 8 to 12 days (8 known cases), the *nest-building itself occupying 7 to 9 days* in this species.

Egg Laying and Incubation

Three eggs were laid (July 1, 3, 4). A Cowbird's (*Molothrus ater*) egg was found with the first warbler's egg. Although the nest was examined on July 2, no additional egg was found, but it is possible that one was removed by the Cowbird (see Nice, 1937:157). However, when the third egg of the warbler was found, the Cowbird's egg was gone from the nest and was later found broken on the ground near the trunk of the home tree. No explanation can be given for its removal.

Not only do different species react differently to Cowbird parasitism (Friedmann, 1929:193), but individuals of the same species may vary likewise. One of the three known pairs of Black-throated Green Warblers near the Biological Station was observed feeding a Cowbird several days out of the nest. Knight (1908:530), on the other hand, cites a case of desertion when a Cowbird's egg was added to the first egg of a Black-throated Green Warbler. Friedmann (1929:245) regards this species as one "very seldom bothered by the Cowbird."

Incubation was done entirely by the female and apparently began with the laying of the last egg. Hatching took place the early morning of July 16, making the incubation period 12 days. Forbush (1929:265) states that the male takes part in incubation, but in the present study, the male was seen at the nest during this period only once when the female, disturbed at the observer's approach, called excitedly and attracted the male, who made an examination and adjustment of the nest contents and then left. Inattentiveness of the male during this period was also noted in two nests by the Nices (1932:166).

No extended observations were made of attentiveness of the female with regard to incubation except for one afternoon, on the second day of incubation, during which time (130 min.) the female was attentive for periods of 32 and 65 minutes (81 per cent), inattentive for 12 and 13 minutes (19 per cent). These figures are similar to those of the Nices (1932:95). During incubation the female was noted to leave the nest when the singing of the male was particularly near, giving a soft *chip* as she left. This has also been noted by the Nices (1932:97) and

suggests that, while the male may not take part in incubation, he may be attentive in the sense that he remains rather close to the nest during the female's absences. (See also Nice, 1937:126). During incubation more or less frequent shifts of position were made. One late afternoon the female was discovered asleep on the nest. When disturbed during early incubation the female left the nest in silence, a fact observed also by Knight (1908:529). However, as hatching time approached, the female became increasingly fearless, and if disturbance continued for more or less prolonged periods, she called excitedly, but the state of alarm was broken intermittently by feeding periods, evidencing a "waning of reactions" in the behavior pattern of the bird as described by Howard (1929:58).

Nestling Stage

At hatching, down feathers were distributed chiefly over the dorsal tracts of the otherwise naked young (coronal and occipital regions of the capital tract, pelvic region of the spinal tract, also the femoral, crural, alar, and caudal tracts); they were longest on the crown (5 mm.). Feather sheaths of the alar tract (remiges) emerged on the fourth day after hatching; those of the major body tracts appeared on the fifth day, at which time the eye slits also began to open. Sheaths began breaking on the seventh day. Weights of nestlings, taken at approximately 5 P.M. each day, are diagramed in the accompanying graph (Figure 1). (The death of one nestling indicated on the weight diagram was caused by exposure following accidental fall from nest.)

Parental Care

Feeding. Both sexes fed the young, the female more often. Brooding of young, like the incubating, was done by the female. Details of feeding activity are presented in Table 2. As indicated, data were extracted from the full day's observation on July 21 for equivalent periods spent at the nest on July 19. From a comparison of these data, it is evident that feeding was more frequent at 5 days of age than at 3 days. As shown by the Nices (1932:102, 166), increased feeding frequency is the general trend during the nestling stage. Distribution of feeding visits by numbers per hour (Figure 2) with two 5-day old young in the nest indicates increased activity in both male and female during early morning, noon, and early evening. In a complete day's observation made by Nice and Nice (1932:97) at a nest with young of the same age, the female fed alone and with less apparent regularity (Figure 2). The total number of feedings for both observations chances to be the same (46). The Nices, however, regard feeding frequency in the case of both females observed as slow (that is, normal, given the

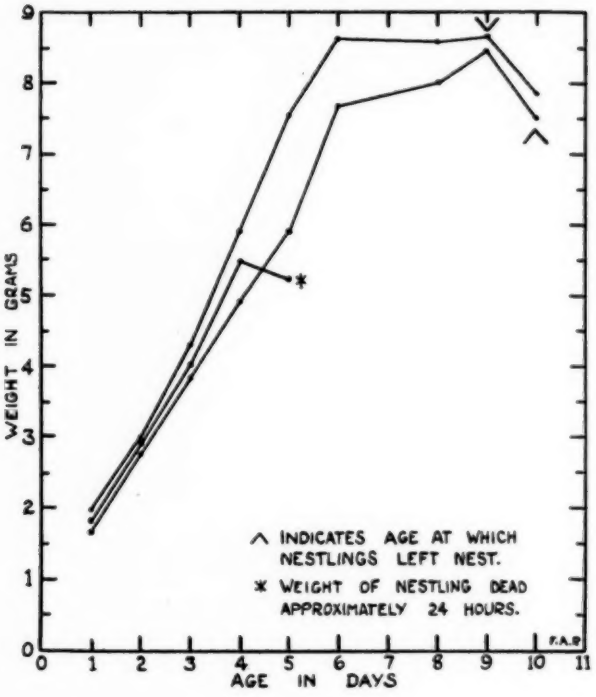


Figure 1. Daily weight increases of Black-throated Green Warbler nestlings.

assistance of the male), following an inherent rhythm adjusted to this assistance (1932:166).

The female's feeding of the young appeared to be independent of that of the male (see also Nice and Nice, 1932:96). However, the appearance of the latter with food at the nest, more often in the absence of the female than in her presence, is probably to be accounted for by the use of the song during the male's approach (see "Songs and Call-Notes") in response to which the female would leave before he appeared. If the male arrived rather soon after the female had fed the young, the female would leave the nest, remaining nearby to return after the male had completed feeding. On one occasion, the female returned to the nest while the male was still feeding and assisted him in re-inserting food in the mouths of the young.

At almost every one of his visits the male, although feeding less frequently, brought more food than the female, a point noted also by Smith (1934:33) during observations on the Black and White Warbler *(Mniotilta varia)*. The males of Black-throated Blue and Myrtle Warblers *(Dendroica caerulescens* and *D. coronata)* have been reported

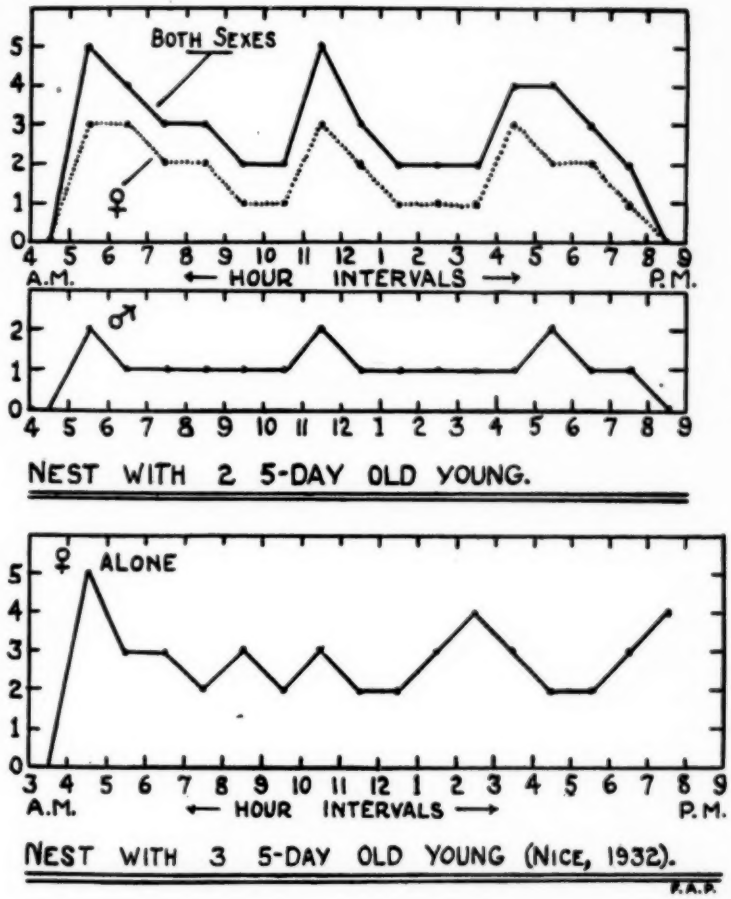
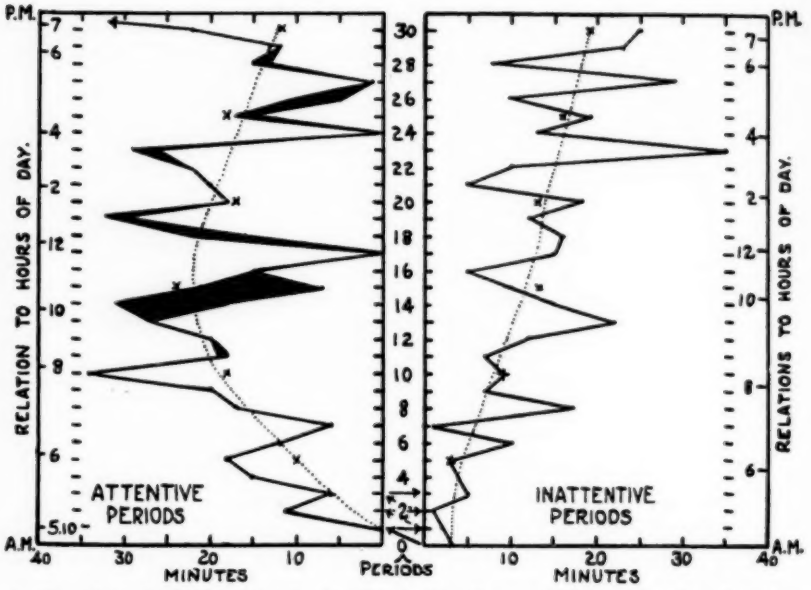


Figure 2. Feeding frequency of adult Black-throated Green Warblers at two nests with 5-day old nestlings (complete day's observation in both cases).

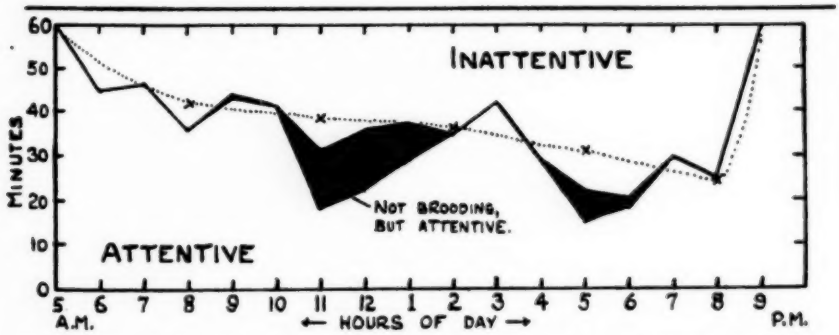
to bring more food per visit than females (Nice, 1930a:60, 1930b:343). In the present study, each of the male's mouthfuls usually consisted of two or three green lepidopterous larvae of one species, measuring about one inch in length. The female brought small Diptera, various small larvae, etc., the bulk of which always amounted to but a fraction of the male's food.

Sanitation. Both sexes removed and swallowed fecal sacs with approximately equal frequency, and on occasions when these were extraordinarily large, they were carried away and probably dropped. Reading and Hays (1933:403) recorded a feeding pair of which only the female removed fecal sacs.

Attentiveness. Observations on the attentiveness of the female



A. Complete day's record of attentive-inattentive periods of female. Sequence-relationship shown by arrows in 0, 1, 2, 3. Dotted lines indicate trends based on averages of every five periods (indicated by small crosses). Darkened outer segments of attentive periods show time during which female was attentive but not brooding.



B. Analysis of attentiveness by fractioning of successive hours. Dotted line indicates trend based on average of every four periods.

Figure 3. Activity of female Black-throated Green Warbler at nest with two 5-day old young.

during the nestling stage are summarized in Table 3 in a manner similar to the feeding data of Table 2. In addition to data from a full day's observation, the table provides a comparison of equivalent periods at 3- and 5-day ages of nestlings. It is evident that attentive periods are shorter, the total attentiveness is less on the fifth than on

the third day. While inattentive periods approximate the same on both days, the total inattentiveness is increased. A plotting of the full day's record of attentive-inattentive periods of the female (Figure 3A) show that attentive periods were longest during the middle portion of the day, while inattentive periods increased in length as the day progressed. Time spent in attentiveness but not brooding (i.e., female perching at nest) is indicated by the darkened portions of attentive periods in Figure 3A. An hour-by-hour analysis of attentiveness (Figure 3B) indicates that attentiveness decreased during the day and shows more clearly the time of day when brooding subsided (darkened portions) though the female was attentive.

In accordance with the above comparison, the Nices (1932:102, 162) show brooding periods to decrease in length during nestling life.

TABLE 2
FEEDING ACTIVITY

Age of Nestlings	3 days (July 19, 1938)	5 days (July 21, 1938)	
Period of Observation	5 hrs., 10 min. (8:35-11:30 A.M.; 1:15-3.30 P.M.)	Same as 3 days	15 hrs., 40 min. (4:20 A.M.-8:00 P.M.)
Number of Nestlings	3	2	2
TOTAL FEEDING VISITS:	9	12	46
Average No. per hour	1.7	2.4	3.1
Extremes	1 to 3	2 to 3	2 to 6
Intervals	7	10	45
Average length	34.7 min.	23.2 min.	19.1 min.
Extremes	5 to 55 min.	1 to 50 min.	0 to 50 min.
No. of Nestlings Fed per Visit:			
Known Instances	6	....	....
Average	2.5	....	....
Extremes	1 to 3	....	....
MALE:			
Total feeding visits	4	5	18
Average No. per hour	0.8	1	1.2
Extremes	0 to 1	....	1 to 2
Intervals	2	3	17
Average	75 min.	50.3 min.	49 min.
Extremes	61 to 89 min.	37 to 62 min.	31 to 90 min.
FEMALE:			
Total feeding visits	5	7	28
Average No. per hour	1	1.4	1.9
Extremes	0 to 2	1 to 2	1 to 3
Intervals	3	5	27
Average	47 min.	44 min.	31.9 min.
Extremes	41 to 52 min.	32 to 57 min.	2 to 64 min.

Brooding ceased on the seventh day after hatching (sixth and seventh days, respectively, recorded in two nests studied by the Nices).

Bigglestone (1914:58) has justifiably called attention to the number of factors, chiefly climatic, affecting the attentive-inattentive periods of at least dendroicine warblers. But the Nices (1932:164) —in spite of a number of variations—find two female Black-throated Green Warblers more alike than different in the matter of attentiveness as well as other respects when compared with nine other species of the Compsothlypidae. As Bigglestone suggests, there is a certain adaptability of behavior under varying conditions. Nevertheless, by studying a *number* of pairs and comparing with closely related species, these variations in behavior may be more accurately evaluated and the inherent, characteristic rhythm more closely determined (Nice and Nice, 1932:166).

TABLE 3

ATTENTIVENESS OF FEMALE DURING NESTLING STAGE

Age of nestlings	3 days (July 19, 1938) [1]	5 days (July 21, 1938) [1]	
Period of observation	4 hrs., 4 min. (9:05-11:30 A.M.; 1:15-3:30 P.M.)	Same as 3 days	14 hrs., 23 min. (5:07 A.M.-7:30 P.M.)
Attentiveness	71% [2]	64%	57% [3]
Periods	4	6	30
Average length	36.3 min.	23.2 min.	16.4 min.
Extremes	33 to 39 min.	18 to 31	0 to 34 min.
Inattentiveness	29%	36%	31%
Periods	6	7	31
Average length	13.3 min.	13.4	12.0 min.
Extremes	7 to 30 min.	5 to 22 min.	1 to 29 min.

[1] Days of observation were clear, mild, and "average" in both cases.

[2] In a complete day's observation, percentages of attentiveness are calculated on basis of time from beginning of first inattentive period to ending of last inattentive period.

[3] This percentage expresses total attentiveness, but only 52% constituted actual brooding since portions of eight attentive periods (see Figure 3) averaging 5.6 min. (extreme 1 to 14 min.) were spent simply near the nest.

Reaction of Adults to Intrusions. Display on the part of the excited adults was not noted until the second day after hatching when the female left the nest upon the observer's approach but remained a few feet from it, fluttering her wings and bending forward slightly. Such a reaction was also observed after the first nestling left the nest, at which time display was more intense. On the same date, the male appeared on the scene and behaved similarly, dragging the outspread tail along, fluttering wings and lowering the head.

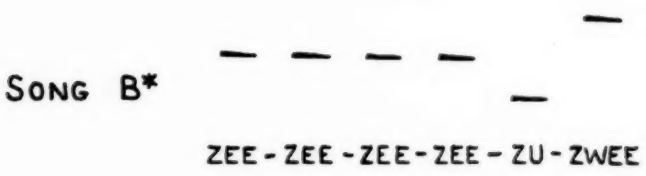
On the eighth day after the hatching, a red squirrel *(Sciurus hudsonicus)* was observed to approach the blind, coming to within seven feet of the nest. At this time, the female simply left the vicinity of the nest at once and gave no alarm notes. Later the same day, when a young Black and White Warbler approached the nest to a distance of five feet, the female pounced upon it and struck with considerable force. When the intruder returned a second time the female flew at it and drove it away. The indifference to red squirrels and at the same time the offensive reaction toward small passerine intruders *(Vireo olivaceus* and *Penthestes atricapillus)* has also been noted by the Nices (1932:160).

Fledgling Stage. Young left the nest 9 and 10 days after hatching. Forbush (1929:266) records length of nest life as 8–10 days, the Nices (1932:171) as 8 and 9 days. After the young left the nest, the male was not observed to take any part in feeding and, save for the single instance of display mentioned above, was not seen near the young. However, both adults of a second pair were observed feeding a Cowbird several days out of the nest, and the Nices (1932:167) report males feeding young out of the nest in nine cases. Following the departure of the second or last nestling, the female continued to bring food to the empty nest. Similar behavior was noted by the Nices (1932:99) in the case of a male, likewise by Mousley (1924:283) in both members of a pair of Magnolia Warblers *(D. magnolia)* and by Common (1933:413) in a female Ruby-throated Hummingbird *(Archilochus colubris)*. Five days after leaving the nest, a single juvenile fed by the female was still in the vicinity of the nest. Nice (1936) reports a molting female Black-throated Green Warbler feeding two fully grown young in winter plumage on September 7 in Massachusetts. Probably the length of fledging dependency is somewhat shorter than this would imply and is similar to that of other dendroicine warblers or closely related passerines. In the Magnolia Warbler (Nice, 1928: 253), this period is at least 22 days; in the Ovenbird *(Seiurus aurocapillus)* (Hann, 1937:212) it is recorded as 30 days, in the Prothonotary Warbler *(Protonotaria citrea)* as at least 19 days (Walkinshaw, 1939), and in the Song Sparrow as 28 to 30 days (Nice, 1937:133). Four weeks is the approximate figure for small passerine birds.

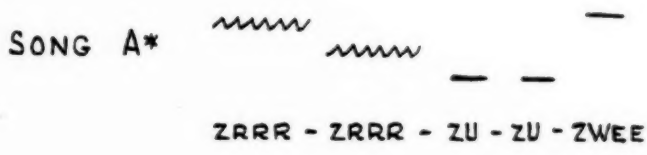
Songs and Call-notes

The Black-throated Green Warbler has two songs, both of which may be given with certain modifications. Comparable interpretations are recorded by Hoffman (1904:113), Thayer (cf. Chapman,

1907:160), and the Nices (1932:168). The first and most common song may be shown as follows:



The *zee's* preceding the *zu-zwee* may be reduced to two or increased to six in number. The second and less frequent song may be shown as follows:



The second or last or both notes may be omitted, resulting in the following modifications: *zrr-zrr-zu-zu* or *zrr-zu-zu-zwee* or *zrr-zu-zu*.

There was an interesting use of the song by the male as an apparent warning to the female brooding the young of his approach to the nest with food. Odum (1931:316) observed the male of a Hooded Warbler *(Wilsonia citrina)* singing during approach to the nest over all of the first seven days of nestling life, suggesting a similar behavior. The present observations were made during the fifth day after hatching (July 21). As a rule, for about three to five minutes before arriving at the nest with food and for the same period after leaving the male sang. During the approach to the nest, song B was given; after leaving either song A or B was given.

The singular thing about the approach song was that the closer to the nest the male came, the softer became the song. When the singer was but a few feet from the blind, the song became a whisper and unless one was aware of the male's presence, it sounded as if coming from the distance. Mousley (1934:215) has suggested ventriloquial properties in the voice of the Crested Flycatcher *(Myiarchus crinitus)*. Aretas Saunders (1929:81) believes that apparent ventriloquism may be due to a psychological condition of the hearer, but in this case the

* In accordance with the Nices' designations.

approach song can be described as ventriloquistic in the sense that it seemed to come from a distance when the singer was close (as Saunders suggests). Usually the female left the nest before the male reached the nest tree. Once the female left the nest in response to a single performance of the song, remaining perched near the nest while the male came with food a minute or so later. On a few occasions the female remained on the nest until the male was within a few feet of her and had given a few soft *chip's* in addition to the whisper song. During the late afternoon when singing subsided, the male approached silently and when only a few feet from the nest, gave the whisper song; whereupon the female left the nest. During the singing periods, song B was given on an average of 5 to 6 times a minute, song A only 3 times a minute. The last (emphatic) note of song B was usually dropped in the whisper song.

The apparent ventriloquistic quality of the song seems adaptive in that there is less possibility of attracting enemies when the male is close to the nest, but nevertheless the song may serve to coordinate behavior of the sexes in that it warns the female of the male's approach with food. In almost all of the cases where the female remained on the nest in spite of the male's approach, the former had fed the young shortly before. The song, while superficially alike in late spring migration and nestling stage, can hardly have the same relation to behavior of the adults throughout these various phases of the breeding cycle (Herrick, 1935:17). Undoubtedly this relation changes as the breeding cycle advances, and during the nestling stage song may well serve a coordinative function in the feeding activities of the adults.

The usual alarm note of the female was a soft *tzip* distinctly less metallic than the *chip* of the male. During the excitement of the first two days after the young left the nest, the female gave a decidedly sharper, louder *chip* upon the observer's approach. Once the female gave a series of soft *chips* directed at a nestling which did not open its bill when she attempted to feed it. The female's call to the young while approaching them was a soft and rapidly repeated *sh-sh-sh-sh-sh* of variable length. On the seventh day after hatching, the nestlings began to utter a rapidly repeated *chi-chi-chi-chi* upon a parent's arrival at the nest or during the observer's handling of them. At time of leaving the nest, young were noted to give two calls, a simple *chip* and a *chi-churr*. Stanwood (1914:188) and Thayer (in Chapman, 1907:160) describe additional call-notes.

Further Studies

In the present paper, certain details of breeding behavior may be contributory to our knowledge of the life history of the Black-throated Green Warbler, but in large part, these observations serve to confirm facts presented by the Nices in a longer, earlier study (1932). Mousley's

(1924) studies of five species of Compsothlypidae (including the genera *Compsothlypis, Dendroica,* and *Setophaga,* but not *D. virens*) present general conclusions on the breeding behavior of North American warblers. The majority of these (numbers 2 to 11) are applicable to the Black-throated Green Warbler, judging from my own experience as well as that presented in the literature. However, as is apparent from data presented here and also from the Nices' detailed table (1932:165), his conclusions regarding feeding rate and length of attentive periods need revision and amplification. Available data indicate that the species of Compsothlypidae vary in a number of phases of breeding behavior—feeding frequency, attentiveness, relationships of sexes, etc. In view of known similarities and close phylogenetic relationships, the detailed study of these variations should prove all the more interesting.

Summary

1. In northern Michigan, the Black-throated Green Warbler is found chiefly in developmental communities in which conifers are available in pure growths or mixed with deciduous growth.
2. Phases of the breeding cycle have the following time lengths: nest building, 4 days; incubation, 12 days; nestling life, 8 to 10 days; dependent period of fledglings, approximately four weeks.
3. Nests are placed at various heights in conifers. A rather extreme variation is noted in strength of nest structure. Materials used in nest structure apparently vary largely according to availability.
4. Both sexes (but chiefly the female) participate in nest building and care of young. In the present study the male was not observed to take part either in incubation or in feeding of fledglings.
5. Observations at 3- and 5-day stages of nestling life indicate an increasing feeding rate over the nestling period and a decreasing amount of brooding, which apparently ceased on the seventh day. Details of feeding frequency and attentiveness are given in tabular form.
6. The female fed more often, though the male brought more food at each visit. While the sexes appeared to be independent of each other in time of feeding, a coordinative behavior was detected in the use of song as an approach warning so that the male usually brought food during an inattentive period of the female.
7. Two songs are characteristic: *zee-zee-zee-zee-zu-zwee* and *zrrr-zrrr-zu-zu-zwee;* these are varied with a number of modifications. Call notes of both adults and young are also described.
8. The song, as given with relation to the male's approach with food for the young, is softened increasingly with approach towards nest to a whisper song having a ventriloquistic quality.

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SPRING ROOSTS OF THE ROBIN

BY JOSEPH C. HOWELL

MANY accounts of the late summer, fall, and winter roosting of the Robin (*Turdus migratorius*) have been published, but few, if any, good descriptions of spring roosting appear in print. Brewster (1890: 364), in his fine account of the summer roosting of the Robin in Massachusetts, found that the roosts were never used before June 11, and usually not until the twentieth of that month. Forbush (1929: 414) infers that the roosts are not used prior to June and that the young do not use the roost until July. This paper is a report of a small roost which was located on the Cornell University campus at Ithaca, New York during the spring, summer, and fall of 1937.

The Robins roosted in a small grove of conifers, occupying a steep northerly slope of 4¼ acres in area. At the eastern end of the roost was a dense, one-acre patch of red pines and white pines. The trees grew very close together, with interlocking branches and were about thirty years old. This was the part of the grove to which most of the birds resorted. The western part of the area was much more open, having a few clumps of white pines and scattered spruces and firs. In outline, the area was rectangular, about 150 feet across and 1200 feet in length. It extended from the southeast to the northwest. Open fields lay to the north and east of the area. To the south and west was a gravel road, and beyond the road were scattered buildings, the nearest being 75 feet from the roost. The northwestern approach was dominated by a heavy growth of large trees and was little used by the birds in coming to the roost.

While the birds were undoubtedly using this roost earlier in the season, their presence there was first noted on April 28, when the sun set at 6:55 P.M. At 7:30 P.M. it was cloudy and a low breeze was blowing. Many birds were in full song, but more of them were only calling. During roosting time, song could have little territorial significance. Perhaps the singing males were unmated birds. There were at least 200 Robins in the conifers. Many flew over my head and into the cover as I stood at the southern exposure of the roost. The roosting birds shifted their position almost continuously, noisily flapping as they moved in the dusk. A true chorus of songs was given and at no time were less than three or four birds singing.

Four Robins were flushed as they roosted in a white pine that held a Robin's nest containing two eggs. This pair had evidently ceased defending its nest-tree from intrusion by other Robins early in the evening, when roosting began. This lull in the defense of the nest with the coming of dusk is probably due to the fact that the female is concerned with incubation and the male rarely roosts in the nest-tree.

By 7:40 P.M. the chorus was over, and only a few chirps and an occasional snatch of song were heard. The birds roosted five to twenty

in a tree, and they flew out in hordes when I walked beneath the pines. The roost was absolutely silent at 7:45 P.M.

On April 29, at 7:24 P.M., the weather was clear and the temperature was about 55° F. The Robin chorus was in full swing. The birds came to the roost singly or in pairs. Many more were calling than singing.

A minute-by-minute count of the Robins entering the roost was made as I stood on the gravel road to the south of the middle of the roost. It was certainly far from a complete count, for the light was poor, the extremes of the roost were 600 feet away from me, and I could count only the birds that came in from the south and west and not those from the north and east. The times given in the following table represent the end of a minute interval.

TABLE 1.

RELATION OF TIME TO THE NUMBER OF ROBINS ENTERING THE ROOST

Period No.	Time	No. of Robins	Period No.	Time	No. of Robins
1	7:27	12	10	7:41	22
2	7:30	17	11	7:42	10
3	7:31	26	12	7:43	4
4	7:34	15	13	7:44	3
5	7:35	30	14	7:45	1
6	7:36	27	15	7:47	2
7	7:37	20	16	7:48	1
8	7:38	23	17	7:49	0
9	7:39	20			
					233

The earlier birds that came to the roost called frequently and often alighted on a lawn, housetop, telephone wire or tree before entering the roost. As they approached the roost they were almost always within 100 feet of the ground and often flew over my head only a few feet out of reach. Between 7:30 and 7:40, when it was almost dark, the birds usually flew straight into the roost with no stops along the way. By 7:48 I could not see what I wrote in my notebook. The last Robin to enter the roost came in at 7:49. It fluttered heavily into a pine, apparently not being well able to see where it was going.

The singing, which was so prominent at 7:24, was carried on by only a few scattered birds at 7:40. At 7:45 only one bird sang and only three called. No songs and only occasional outbreaks of chirping were heard after this. After 7:50 all was quiet.

On April 28 it was cloudy and silence came to the roost five minutes earlier than it did on the following day, when it was clear.

An attempt was made on April 29, and at subsequent dates, to trap Robins as they came to the roost in the deep dusk. It was my hope that they would not be able to see me. However, it turned out that no Robins came to roost after darkness had arrived, and in the last faint

glow of twilight they were always able to see me or a net set for them to fly into.

On April 30 the roost was visited at 7:30 P.M., when the weather was clear and the temperature was 55° F. Fifty Robins were frightened from a brushy spruce that was only 35 feet high. The birds roosted both against the trunk and near the tips of horizontal branches. The birds flushed from the trees flew out heavily, often rising more or less straight into the air, but sometimes going to a nearby tree. Those ascending vertically seemed to get their bearings soon and flew down to a new roosting place, where they had little trouble in finding a perch. When the beam of a weak flashlight was played on the birds they "froze," with their eyes open and their necks outstretched. They appeared to be confused by the light and were nervous and ready for action.

On May 3 three adult Robins were collected as they roosted. Two of these proved to be females. The condition of the ovary indicated that one of the females would have laid an egg in a day or two. The yolk of the largest egg was fully matured. In the ovary of the other female the largest yolk was 5 mm. in diameter, which is a little over a third of the diameter of a mature yolk. The presence of these females in the roost at this stage in the nesting cycle shows that the nest is not protected at night by the parents until the first egg is laid. Recently completed nests, in which an egg had not yet been laid, were visited on a few occasions, and in no case was a parent Robin flushed from the nest or close to it.

Nests containing eggs were often visited at night. One of the parents was always on the nest, but the other parent did not roost near the nest. In the few occasions where the sex of the incubating bird could be determined, it was a female. The nesting male birds in the region surrounding the roost left the immediate vicinity of their nests at dusk and flew to the roost. This observation was borne out by collecting seven Robins in the roost, all of which were male birds, between May 6 and July 10, 1937. At this season almost all of the female Robins spent the night on the nest.

On the evening of May 6 the roost was visited after the birds had settled down for the evening, and a number of them were flushed. They were quiet until disturbed, but as they fluttered off they usually chirped a few times.

Young Robins began using the roost as soon as they were able to fly sufficiently well to reach the roost. They were usually about three weeks old when they ceased spending the night in the vicinity of the nest in which they were raised.

No other Robin roost was known to be located near this one. Robins were seen flying to the roost from points half a mile away. As some of these birds were flying rather high when observed, it is probable that

birds within a mile radius of the roost used it each evening. At night the only Robins not using the roost were female birds that were incubating eggs or brooding young.

For purposes of comparison some of the observations of Emlen (1934: 341–343) are given here. His studies were made during spring and summer from 1927 to 1931[1] at Cresheim Creek, Philadelphia, where thousands of Robins were roosting with even larger numbers of Grackles and Starlings. The first spring arrivals visited this place at night, and from then on they continued to return night after night in seemingly numberless multitudes. The roosting site was a thirty-year plantation of hemlock and pine on a hillside. While the blackbirds roosted high in the trees, the Robins seemed to prefer the lower branches, where they were left unmolested. A common place to find them was on a broad, dense horizontal branch of hemlock from 7 to 10 feet from the ground. Frequently a bird would be encountered conspicuously roosting only a few feet up and well within reach of prowling terrestrial predators. When roosting at low elevations, the birds were often only 18 inches in from the tip of a branch, but when the site selected was near the top of a tree they were usually huddled close against the trunk.

Dr. Emlen banded several hundred Robins at the roost. They were captured by spotting them at night with a flashlight. Some of the Robins banded in April were recovered as far north as Newfoundland in the summer. Thus the roost served as a resting place for migrating Robins en route to a more northern nesting ground.

As the spring advanced this roost diminished in size, but served as headquarters and nightly rendezvous for a large number of Robins throughout the entire summer.

Summary

During the spring of 1937 a company of from 200 to 300 Robins roosted in a small grove of conifers on the Cornell University campus, at Ithaca, New York. Activities at this roost were studied from April 28 to July 10. The following facts were ascertained:

On April 29 (the sun set at 6:56 P.M., E.S.T.) Robins were entering the roost at the rate of about fifteen a minute at 7:30 P.M. About twenty a minute entered the roost between 7:31 and 7:41, following which time not more than ten birds entered the roost during any one-minute period. The last bird entered the roost at 7:49.

Robins came to roost from all directions, although few birds flew in from the northwest, where there was a heavy growth of large trees. The birds came from distances of more than half of a mile.

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[1] Dr. Emlen made spring visits to the Cresheim roost on the following dates: 1927, April 12, 13, 19, 25, 28, May 7; 1928, March 18, 25, April 7, 8, 14, 15, 19, May 4, 12; 1929, April 6, 12; 1930, March 23, May 4; 1931, March 27, April 4.

A chorus of song was given by the roosting male birds. This chorus played no part in territorial behavior.

A tree in which a Robin's nest containing two eggs was located was used as a roosting site by four Robins.

Female Robins continued to use the roost until a day or two before they laid their first egg.

Male Robins spent their nights in the roost throughout the nesting period, leaving their mates to guard and care for the nest.

Young Robins began using the roost as soon as they were able to fly to it.

A roost studied at Cresheim Creek, near Philadelphia, by Dr. John T. Emlen, was used by resident Robins and also by transients en route to a more northern breeding area. This fact was determined through the recovery of banded birds from as far north as Newfoundland.

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VARIATION OF THE EXTERNAL EAR-OPENING IN THE STRIGIDAE

BY LEON KELSO

IN WILLUGHBY'S ORNITHOLOGIA and other early works the few known species of owls were classed according to presence or absence of ear-tufts. When more species became known and the structure of owls was studied in greater detail it was realized that a classification based on ear-tufts alone was not entirely satisfactory. Our present-day classifications based on structure of the external ear may likewise need revision after the anatomy of some tropical species has been investigated.

The subdivision of the family Strigidae has long been a source of disagreement and the present paper does not attempt to settle the matter. The study of the classification of owls has always been handicapped by a lack of preserved specimens and skeletons of the tropical species. Until these are available a final phylogenetic arrangement must wait. The aim of this paper is to show the general variation tendencies in the external ear-opening or ear-conch.

As a Subfamily Character

Savigny (1809) and Cuvier (1817) seem to have been the earliest to use the ear-conch in subdividing the Strigidae. Macgillivray (1836, 1840) published the first illustrated studies of the ears of owls. Kaup (1859) made use of ear characters in his revision, as did Sharpe (1875). Collett (1881), whose work was translated by Shufeldt (1900), made a detailed study of the ear-openings and crania of ten species of boreal Europe. Pycraft (1898:259-263) described the ears of 18 species of owls, placing less emphasis on the ligamentous bridge than did Collett. Later (1903:44, 45) he described the ear of *Phodilus*. Ridgway (1914: 618–622) made extensive use of external ear characters in his key and diagnoses of owl genera represented in North and Middle America. He warned however that a classification based on ear structure alone would probably be far from satisfactory. Peters (1938) measured the ear-conches of a number of species.

The inner details cannot be studied in all species at present because they are not evident in skins and whole preserved specimens are not available. There is a shrinkage of 1 to 3 mm. in diameter of ear-openings in dried skins.

On the basis of the above studies Sharpe and some subsequent writers have separated the Strigidae into two subfamilies: Striginae, characterized by having the ear-conch at least half height of skull in vertical diameter, or larger than eye, its margin produced into a dermal flap of varying width, with a ligamentous or muscular bridge across the opening; and Buboninae, characterized by openings less than half height of skull, without flap and bridge.

The dermal flap is an outward extension of the skin along the bases of the feathers surrounding the opening. The bridge is an outward extension of a ridge or shelf below or behind which the auditory passage enters the skull.

The ten boreal species studied by Dr. Collett do indicate that the proposed subfamilies are quite distinct. The Strigidae are not primarily a boreal family however, and their taxonomy cannot be finally determined on the basis of the northernmost species. Just as the genus *Phodilus* tends to bridge the gap between Tytonidae and Strigidae, so some tropical species tend to merge the proposed subfamilies.

The writer would call attention to the following points:

1. There is a distinct though narrow dermal flap on the posterior margin of the ear-conch in living or preserved specimens of such bubonine species as *Otus asio, O. choliba, O. leucotis, O. vermiculatus, Bubo bubo, B. lacteus,* and *B. coromandus,* and species of *Ciccaba.*

2. The ligamentous bridge is apparent in *Otus asio, O. choliba,* and *Bubo bubo* as a shelf above the entrance of the auditory passage into the skull. According to Hodgson (1837:372), there is a very distinct bridge in *Bubo cavearea* [= *B. bengalensis*].

3. *Pulsatrix melanonota* and *P. koeniswaldiana* (subgenus *Novipulsatrix*) are intermediate between the proposed subfamilies, their ear-openings having the small size of the bubonine group but the oval shape, dermal flap (particularly on the posterior margin), and interior transverse ligament of the strigine group. They are intermediate in iris color, ear, and plumage characters between the admittedly strigine *Strix rufipes* and the bubonine *Pulsatrix perspicillata.* The skeleton of the latter species has both bubonine and strigine characters but is closer to *Bubo.*

On the basis of ear characters, facial feathering, and bare toes, *Novipulsatrix* could well be considered generically distinct,—as much so as *Mimizuku, Nesasio, Lophostrix, Jubula, Rhabdoglaux, Berneyornis, Rhinoptynx, Gymnasio,* and *Ketupa.* It has the recommendation of not being monotypic.

4. The genus *Ciccaba* shows affinity to both *Bubo* and *Strix* although usually classed as bubonine. The right ear openings of *Ciccaba virgata* (about 22 mm.), *C. borelliana* (21 mm.), *C. nigrolineata* (20 mm.), *C. albitarsis* (23 mm.), *C. hylophila* (24 mm.), in dry skins, are over half the height of the skull in greatest diameter, a strigine character. The smaller left ear opening is another strigine character. While skins of all of them do not show the transverse ligament and dermal flap, freshly killed or preserved specimens might show traces of such. The skeletal characters of *Ciccaba* place it closer to *Strix* than to *Bubo. Ciccaba albitarsis* is a step toward *Strix fulvescens* in size and character of ear openings and in its Temperate Zone habitat.

5. *Strix indranee* and *S. leptogrammica* (Subgenus *Bulaca*) of the

Indian Region are intermediate between *Bubo* and *Strix* in build, relative length of primaries, shape of facial disk, and color of the iris. While there is a dermal flap present, the vertical axis of the ear-conch scarcely equals half the height of the skull.

6. In the living *Otus asio naevius,* and in *Bubo bubo* (Macgillivray, 1836:344b) the vertical axis of the right ear-conch is fully half the height of the skull, 12-15 and 26-31 mm. respectively. Furthermore, in *Bubo bubo* the hollow of the conch proper, or cavernum, extends upward between the skin and the skull to the crown (Pycraft, 1898:260). The same is true in *Surnia ulula.*

It is thus evident that some species of four different genera have a combination of the supposedly diagnostic ear-opening characters of both of the proposed subfamilies.

As Correlated with the Environment

Among closely related species of owls the size of the ear-opening shows a parallel variation similar to that of wing length and foot feathering. In closely related groups the northern species have relatively larger ear-openings with more conspicuous dermal flaps than the southern.

As shown in the following table, large-eared species (those with ear-conch at least half height of skull in vertical axis) comprise a higher percentage of the owls in the Temperate and Boreal Zones than in the Tropical Zones. The Tytonidae (Barn Owls) and *Phodilus* (Bay Owls), which are mainly tropical and have uniformly small conches, are not included. Only non-migratory continental Strigidae are considered.

TABLE 1

Regional Ratios of Large-eared to Small-eared Strigidae

Region	No. of species	Species with large ear-conch	Species with small ear-conch
Transition, Canadian, Hudsonian, Temperate, and Boreal Zones of the Americas	22	12 (54.5%)	10 (45.5%)
Subtropical and Tropical Zones of the Americas	51	8 (15.6%)	43 (84.4%)
Boreal Europe and Asia	10	6 (60.0%)	4 (40.0%)
Tropical Africa	23	2 (8.7%)	21 (91.3%)
Tropical India	30	6 (20.0%)	24 (80.0%)

The resident owls of New Zealand, Australia, and the Philippines are all small eared.

The following evidence of southward reduction in ear size may be noted. In *Otus asio naevius* the ear-conches are 8-12 mm. in vertical

axis, while those of the southern *O. a. asio* are 6-8 mm. *Otus choliba, O. vermiculatus,* and *Ciccaba albogularis* of tropical America are as large as *O. a. naevius* in body size but the ear-conches are smaller, 6-9 mm. *Lophostrix cristatus* and *Strix woodfordi,* tropical species twice the size of *naevius,* have ear-openings just as small, 10-12 mm. Tropical *Pulsatrix perspicillata saturata* is as large and stout as boreal *Bubo v. virginianus* but the ear-conches are only slightly larger than in *Otus,* 10-14 mm., instead of 16-20 mm. as in *Bubo v. virginianus. Bubo nipalensis* and *B. orientalis* of the Indian tropics have ear-openings as small in relative size as those of *P. p. saturata.* In *Ninox, Athene,* and *Glaucidium* they are even smaller.

This tendency is contrary to Allen's (1877) rule of variation in mammals, according to which, in related forms the external ear is relatively larger southward, instead of northward.

Closely correlated with the larger ear-openings and dermal flaps of northern owls is the occurrence of a more broadly rounded facial rim which extends farther above the eye, wings with fewer emarginate primaries, more extensively feathered feet, and (in *Strix uralensis, Scotiaptex, and Cryptoglaux*) an unsymmetrical skull.

The asionine genera (*Asio, Rhinoptynx,* and *Pseudoscops*) have ear-conches with vertical axis greater than the height of the skull, narrow and slit-like, with dermal flaps continuous around the margin. In northern species of *Asio* the auditory canal enters below the bridge in the right ear, above the bridge in the left ear. This group may prove separable when preserved material of the tropical species is examined. The aegoline genera (*Cryptoglaux* and *Gisella*) having ear-conches about equaling the height of the skull or greater, oval in shape, with continuous dermal flap, and unsymmetrical skulls, may also be separable as a subfamily when their tropical species have been studied anatomically.

It seems likely that in the asionine, aegoline, and strigine groups, the large ear-openings, like the dense feathering of their feet, developed independently through parallel evolution.

A few remarks on the relative importance of external ear structure and foot feathering as taxonomic characters may be in order here. It has been proposed that, for owls, foot feathering be considered a character of subspecific significance only. Many tropical species have bare toes. There are three facts to remember when considering this view.

(1) Among species, foot feathering shows less correlation with climate than does size of ear-opening. The species with bare toes comprise 74.51, 65.22, and 36.67 per cent of the owl species in continental tropical America, Africa, and India respectively, while small-eared species comprise 84.4, 91.3, and 80.0 per cent in those regions.

(2) In *Asio otus, Cryptoglaux funerea, Otus asio,* and *Tyto alba*

the final extent of foot feathering is established at or before time of hatching, while the dermal flaps, and final shape of the ear-opening are then scarcely evident.

(3) Several characters of tropical genera—shorter, more rounded wings; more primaries emarginated; stouter bill and feet; shorter, less compact feathering—are strongly correlated with tropical climate throughout the Strigidae, and indeed, the whole class Aves. Dismiss these along with size and coloration, and nothing is left to support many long-recognized tropical genera.

Summary and Conclusions

1. The ear-conches of some species of *Pulsatrix* and *Ciccaba* are intermediate in structure between those of *Bubo* and *Strix*. The ear-conches of some species of *Otus, Bubo,* and *Strix* are likewise intermediate in character. The proposed subfamilies Buboninae and Striginae, as defined on the basis of these ear characters, are therefore not perfectly distinct.

2. In the Strigidae there is some correlation between size of ear-opening and climate. Among closely related genera or in genera of wide distribution, the species confined to tropical climates usually have relatively smaller ear-conches. In cold climates species having large ear-openings with large dermal flaps are more numerous, while in tropical climates species having small ear-openings with scarcely any dermal flap greatly predominate. This is contrary to the tendency in mammals (Allen's Law), according to which the external ear is relatively larger in southern forms.

3. Those species of Strigidae having larger ear-openings usually have a more complete facial disk and rim, and more extensively feathered feet. In a few cases (*Strix uralensis, Scotiaptex,* and *Cryptoglaux*) the large ear is associated with an unsymmetrical skull.

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1370 TAYLOR STREET, N.W., WASHINGTON, D.C.

FIELD BOOK OF ANIMALS IN WINTER. By Ann H. Morgan. G. P. Putnam's Sons, New York, 1939: 4 x 6¼ in., xv + 527 pp., 283 illus., including 4 color pls. $3.50.

All of the four colored plates and more than 60 pages of the text of this excellent little manual are devoted to the winter birds of the northeastern states. The engravers have handled Roger Peterson's paintings so well that in spite of their extreme reduction in size most of the 81 species shown on the plates are very successfully represented. The text includes very brief discussions of such topics as winter food, migration, and winter flocks but most of it is devoted to details of identification points, habits, and distribution of the several species.

Unfortunately the author follows the modern but confusing custom of not capitalizing the English proper names of birds. This, combined with the occasional use of such purely literary synonyms as "white-vested nuthatches," will surely be confusing to beginners. When a new edition is needed the author should ask some ornithologist to go over the bird nomenclature, both scientific and common, and remove its many small but annoying inconsistencies. At least the misspelling of *Arquatella* should be corrected and if most birds are to be listed under trinomial scientific names the reader should not be told that all "horned larks" are called simply *Otocoris alpestris* and breed "in the Arctic zone of Canada and Newfoundland."

We regret that the author has repeated the old legend that because of past importations of Texas Bob-white "most of the present northern quail are small as compared with birds captured sixty years ago, and they are probably more easily killed off by hard winters." There seems to be no real proof of this and Milton Trautman and others have presented strong evidence against it.

Few bird students are so specialized in their interests that they will not be led irresistibly, to their own great benefit, into reading the other sections of this attractive book which recount the characteristics and habits of the surprisingly large vertebrate and invertebrate fauna to be found in winter in our northeastern states.—J. Van Tyne.

A NEW TUFTED FLYCATCHER[1] FROM HIDALGO

BY GEORGE MIKSCH SUTTON AND THOMAS D. BURLEIGH

IN identifying the birds collected by the John B. Semple 1939 expedition to eastern Mexico, we find that our series of eight *Mitrephanes phaeocercus* from Jacala, Hidalgo, belong to an undescribed race that presumably represents the species at the northeasternmost edge of its range. We propose to call this form

Mitrephanes phaeocercus hidalgensis, subsp. nov.

TYPE.—Adult male in fresh plumage, Louis Agassiz Fuertes Memorial Bird Collection at Cornell University, No. 6558; La Placita (elevation about 6000 feet), along main highway six miles south of Jacala, Hidalgo, April 8, 1939; collected by George Miksch Sutton.

SUBSPECIFIC CHARACTERS.—Differs from all known races of *Mitrephanes phaeocercus*[2] in one striking character: the uniform, strongly greenish tone of the crown, hind neck, and back. Like *M. p. phaeocercus* (Sclater) in size, but greener above, with crown, hind neck and back the same shade throughout rather than darker on crown; smaller, darker above and below, broader-billed, and greener above than *M. p. tenuirostris* Brewster; larger, and greener above than *M. p. nicaraguae* Miller and Griscom; and lighter, and greener above than *M. p. quercinus* van Rossem, a richly colored form in which the darkness of the crown contrasts sharply with the lighter tone of the hind neck and back.[3]

RANGE.—So far as is known, the mountains of northern Hidalgo.

REMARKS.—It is significant that no specimen of the 13 *M. p. phaeocercus* (from central and southern Vera Cruz, Guerrero, Morelos, Oaxaca, Michoacan, and Guatemala) or the 18 *M. p. tenuirostris* (from Jalisco, Durango, Guerrero, Mazatlan, Morelos, 'Mexique', Chihuahua, Sonora, and Tepic) examined in connection with our study, shows any marked intergradation with ***hidalgensis*** insofar as greenness in tone of the upper parts is concerned. Several specimens in the U. S. National Museum are, on the other hand, intermediate between *phaeocercus* and *tenuirostris* in color and in width of bill, extreme individuals of *tenuirostris* being instantly recognizable by their narrow bills, but other pale large-sized birds being quite broad-billed enough for *phaeocercus* or for any other of the known races.

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[1] The common name currently used for this bird is Dusky-tailed Flycatcher, an inept and misleading name based on Sclater's specific name *phaeocercus* rather than on Coues' generic name *Mitrephanes*. The name Crested Flycatcher is already in general use. Since the bird's distinct, triangular crest is surely its most noticeable external anatomical feature we hereby suggest the name Tufted Flycatcher. This name describes the bird's appearance and less directly its personality, whereas Dusky-tailed Flycatcher does neither.

[2] We do not agree with Hellmayr in calling *Mitrephanes aurantiiventris* (Lawrence) and the other yellow-bellied forms from farther south conspecific with *phaeocercus*.

[3] The flycatcher described as *Mitrephanes phaeocercus pallidus* Carriker and de Schauensee (*Proc. Acad. Nat. Sci. Philadelphia*, 87, 1935, 435) has been shown to be *Empidonax fulvifrons fusciceps* Nelson (see de Schauensee, *Auk*, 54, 1937, 540).

The four specimens of *quercinus* examined (from Guatemala and Honduras) are uniform in being dark in general appearance, brown rather than olive above, and very dark-crowned.

Our series of seven *hidalgensis* (four males, three females) are strictly uniform insofar as coloration of the upper parts is concerned. One male (G.M.S. field catalog No. 8537) is so richly colored on the throat and belly as to indicate considerable variation in the intensity of the general tone of the underparts. This same variability is noticeable also in *phaeocercus* and *tenuirostris*.

It appears that *hidalgensis* has evolved as a green-backed, northeastward-ranging extreme. Where the greenest-backed birds live will be revealed only when the northeastern frontiers of the range of the species have been thoroughly investigated.

MEASUREMENTS.—Type, wing, 71 mm.; tail, 62.5; exposed culmen, 10; tarsus, 13. Three other males: wing, 71, 71, 72; tail, 61.5, 63, 60.5. Three females: wing, 69, 70, 69; tail, 60, 60, 60.

We are grateful to the following for their assistance: A. J. van Rossem, Alexander Wetmore, Pierce Brodkorb, J. Van Tyne, and the authorities of the U. S. National Museum and U. S. Biological Survey.

CORNELL UNIVERSITY, ITHACA, NEW YORK
U.S. BIOLOGICAL SURVEY, GULFPORT, MISSISSIPPI

THE BIRDS OF DENVER AND MOUNTAIN PARKS. By Robert J. Niedrach and Robert B. Rockwell. The Colorado Museum of Natural History, Popular Series No. 5, 1939: 6 x 9 in., 126 pp., illus. $1.25 postpaid.

The authors and Alfred M. Bailey have produced for bird students of the Denver region a local handbook of unusual excellence. The annotated list of about 363 species and subspecies includes notes on field marks, abundance, zonal distribution, and remarks on habits and local status. The book is illustrated with many fine photographs of wild birds, some of them species rarely photographed, and several habitat pictures based on museum groups. This well-rounded book includes a folding map, key to localities, accounts of topography and life zones, an ornithological history of the region, a rather full bibliography, and an index to bird names.

It seems unfortunate that the authors of a faunal contribution like this should feel bound by some "authority" supposed to be inherent in the A.O.U. Check-List. In a number of cases they dutifully head the account of a bird with the scientific name which was used in the 1931 edition of that check-list and then show in a subsequent paragraph that they know some other designation to be more correct.—J. Van Tyne.

AN ALBINO LESSER SNOW GOOSE IN MANITOBA

BY J. DEWEY SOPER

TO Mr. A. Haak, Norwood, Manitoba, goes the credit for making the unusually interesting discovery of an albino Lesser Snow Goose (*Chen hyperborea hyperborea*). This occurred on April 24, 1939, as he was studying and photographing Blue and Lesser Snow Geese a few miles northeast of Meadows, Manitoba. This locality lies well within the celebrated concentration area where these birds feed and rest in prodigious numbers during the spring migration from Louisiana to the Arctic.

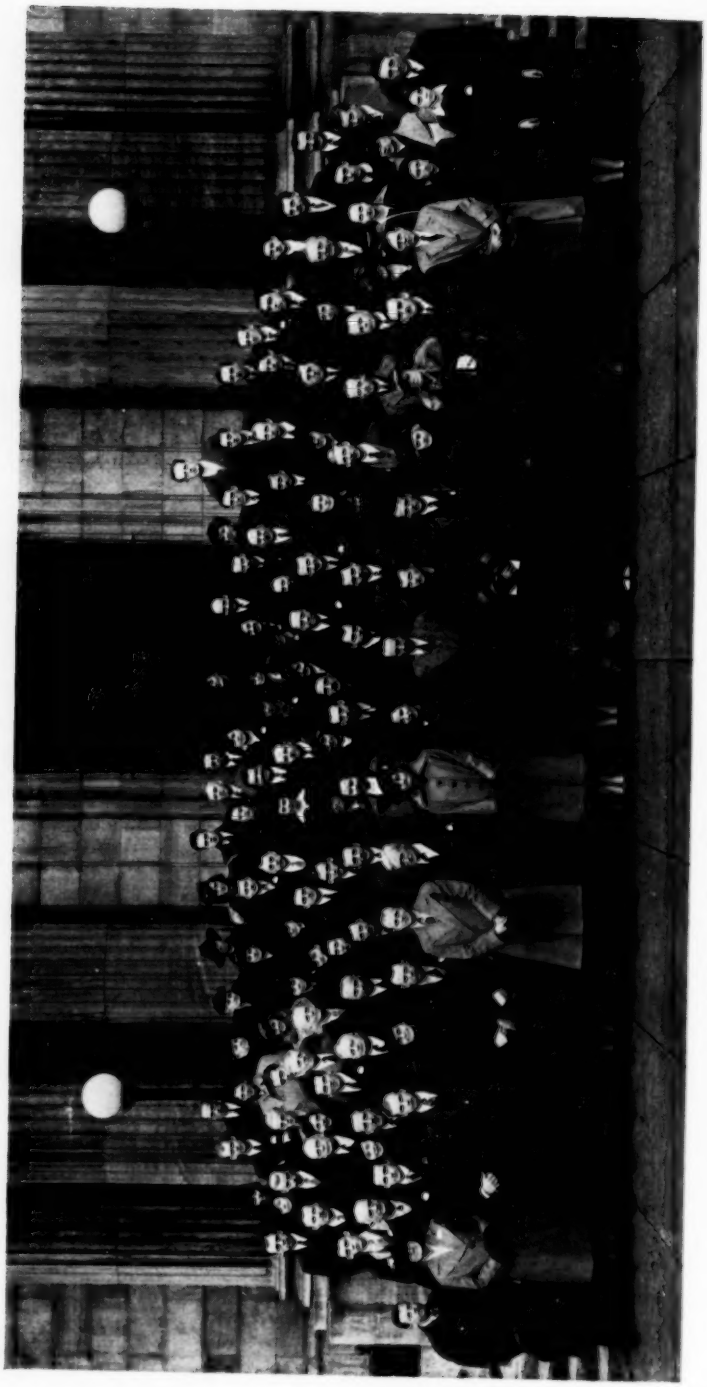
On this particular day, geese were disposed in dense masses on the sodden lowlands. Mr. Haak, from the confines of a blind, was intent upon securing some good flight pictures of the birds as they shifted in restless detachments about the district. Finally, in early afternoon the best opportunity presented when flocks passed within close range. A very small group contained the pure white individual referred to, which is assumed to be an albino Lesser Snow, rather than a Blue Goose (*Chen caerulescens*). One of the resulting "shots" was the exceptionally attractive photograph herewith reproduced, showing the albino at the lower right; it looks strangely immaculate in such spotless garb, brightly illuminated by the afternoon sun. As will be realized, the only Lesser Snow Goose diversion from the normal which would arise from albinism is the lack of black primaries in the wings.

Mr. Haak informs me that this is the only albino goose of the kind which he has ever seen, though hundreds of thousands of typical Blues and Lesser Snows have come under his scrutiny during successive periods of migration. Other Manitoba naturalists have also had very extensive experience along these lines without, to my knowledge, seeing a pure white goose. My personal observation has collectively embraced vast numbers of these birds on the Arctic breeding grounds, and during the Manitoba migrations, without detecting a single albino. I have been unable to find any reference in the literature to such an individual, previously seen and recorded. All of this would seem to conclusively indicate that albinism is extremely rare in either of these species and that an individual, such as is shown in the photograph, is but one in millions.

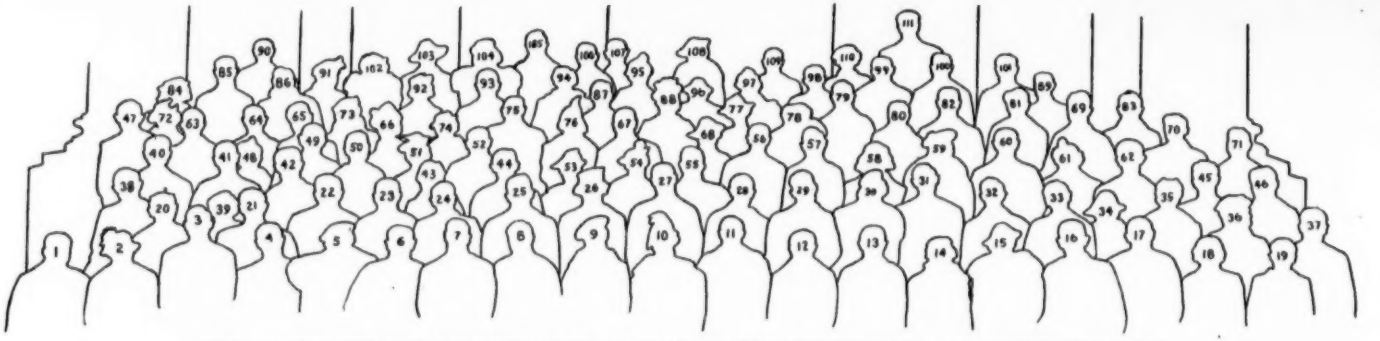
NATIONAL PARKS BUREAU, DOMINION PUBLIC BUILDING, WINNIPEG, MANITOBA.

Photograph by A. Haak

Albino Lesser Snow Goose (lower right)



Group at the Annual Meeting, Louisville, November 25, 1939



KEY TO THE WILSON ORNITHOLOGICAL CLUB GROUP PHOTOGRAPH AT LOUISVILLE, 1939

1, Miles D. Pirnie. 2, Mrs. Lynds Jones. 3, O. S. Pettingill, Jr. 4, Gustav Swanson. 5, Mrs. Margaret M. Nice. 6, Carleton A. Beckhart. 7, Louis G. Flentge. 8, W. E. Saunders. 9, Mrs. Louis G. Flentge. 10, Mrs. Victor Coles. 11, Victor Coles. 12, Gerald Rogers. 13, James LaFollette. 14, Margarette E. Morse. 15, Vera Carrothers. 16, A. F. Ganier. 17, Floyd S. Carpenter. 18, Kate Roberts. 19, George R. Mayfield, Jr. 20, Lynds Jones. 21, G. M. Sutton. 22, C. W. G. Eifrig. 23, I. B. Boggs. 24, Parks Allen. 25, B. W. Baker. 26, Sylvia Staudt. 27, Reed W. Fautin. 28, Lawrence H. Walkinshaw. 29, Edward M. Brigham, Jr. 30, Mrs. Eugene P. Odum. 31, Eugene P. Odum. 32, George B. Thorp. 33, Maurice Brooks. 34, Mrs. Lucien Beckner. 35, Hedvig Swanson. 36, Mrs. George R. Mayfield. 37, Leonard C. Brecher. 38, Conrad Jamison, Jr. 39, Mrs. R. L. Mercke. 40, Karl H. Maslowski. 41, Harrison F. Lewis. 42, L. E. Hicks. 43, Margaret E. Gross. 44, Wm. A. Lunk. 45, George N. Rysgaard. 46, Peter Ward. 47, Joseph F. Spears. 48, Mrs. Karl H. Maslowski. 49, C. O. Decker. 50, L. B. Nice.

51, Theodora Nelson. 52, Harvey B. Lovell. 53, Emilia Yunker. 54, Amelia R. Laskey. 55, James B. Young. 56, Harry Leon Kutz. 57, S. Charles Kendeigh. 58, Isabelle Hellwig. 59, Mrs. H. S. Hill. 60, H. W. Hann. 61, Mrs. C. N. Edge. 62, Lucien Beckner. 63, Gordon Acomb. 64, Lawrence Acomb. 65, Allan Kain. 66, Mrs. George Kelly. 67, Cleveland P. Grant. 68, Mrs. O. S. Pettingill, Jr. 69, Peter Edge. 70, Earl G. Wright. 71, Peter Koch. 72, Mabel Slack. 73, Doris Huestis Speirs. 74, Mrs. John H. Mayer. 75, Robert W. Glenn. 76, Mrs. Cleveland P. Grant. 77, Mrs. Lawrence I. Grinnell. 78, Jeannette Duer. 79, Lawrence I. Grinnell. 80, William M. Walker, Jr. 81, G. H. Deutschlander. 82, Henry Meyer. 83, Don J. Wright. 84, Dorothy Hobson. 85, Joseph C. Howell. 86, J. Murray Speirs. 87, Richard L. Weaver. 88, Mrs. Gustav Swanson. 89, Karl E. Bartel. 90, J. Southgate Y. Hoyt. 91, Mrs. C. E. Peterson. 92, Margaret R. Knox. 93, John B. Calhoun. 94, Mary Lou McConnell. 95, Clara Alma Moore. 96, Mildred F. Campbell. 97, Maxine Smith. 98, Wendell P. Smith. 99, J. D. Webster. 100, John L. George. 101, Wm. M. Clay. 102, Mrs. E. O. Wilson. 103, Evelyn J. Schneider. 104, Mrs. Roger W. Barbour. 105, Roger W. Barbour. 106, W. C. Henderson. 107, Arthur Stupka. 108, Mrs. Frank Warner. 109, Burt L. Monroe. 110, Mrs. Josselyn Van Tyne. 111, Josselyn Van Tyne.

GENERAL NOTES

A Feeding Habit of the Herring Gull.—On November 18, 1939, I observed a flock of about 200 Herring Gulls (*Larus argentatus*) in a field in the southwest corner of Milwaukee County, Wisconsin, about ten miles from Lake Michigan. They were eating insects and worms in a newly plowed field and their method of following the plow seemed worthy of note.

Instead of the flock following the plow down the furrow as do grackles and other birds, these Herring Gulls were uniformly distributed the length of the field, which was about forty rods long and half as wide. The farmer was plowing with a two-plow tractor. As he plowed down the west side of the field, the gulls in the furrow on the east side would wait until he came opposite them and then fly across the field and start feeding in the furrows on the west side. Thus as the farmer plowed down the west side of the field a wave of gulls progressed down the field with the tractor. When the tractor reached the end of the field all the gulls were on the west side. As the farmer started up the field on the east side, the wave of gulls flying across the field kept pace with the tractor, so when he reached the other end of the field all the gulls were on the east side.

Thus, although the wave of gulls progressed the length of the field and back again behind the tractor, no one bird ever followed the tractor. Always there were different individuals alighting back of the tractor from that part of the other furrow directly opposite the tractor. In this way the birds all kept the same relative position in the field and each picked up food from a small area of ground. If a gull finished picking up all the food in its area, it did not fly or walk up or down the furrow but waited until the tractor had again passed it on the other side of the field and then flew across and again started to feed in its small area.

Within a short distance there were two other farmers plowing. As far as I could see all conditions on those fields were the same as on the field occupied by the gulls but neither of these two fields had a single gull feeding upon it. There seemed to be no plausible explanation of this unless it was due to the gregarious nature of the Herring Gull.—Alvin L. Throne, *State Teachers College, Milwaukee, Wisconsin.*

Raven in Southwestern Michigan.—According to W. B. Barrows ("Michigan Bird Life," 1912), the Raven was originally an abundant bird in Michigan. However, its range and numbers decreased. By 1912 the Raven population in the Lower Peninsula was restricted almost entirely to the northern part.

On April 27, 1889, Mr. F. H. Chapin of Kalamazoo, Michigan, found the Ravens nesting in a large swamp in Almena Township, Van Buren County, Michigan. One of the two birds which were near the nest was shot. I have examined the skin of this juvenile bird and the original records of Mr. Chapin, which are now in the University of Michigan Museum of Zoology. In 1892, on Mr. Chapin's last visit to the swamp, he heard one Raven, but could not find any trace of a nest. However, on April 23 of the same year he noted Ravens near the Gun River in southeastern Allegan County.

Since that time the Raven has apparently been very rare or absent from southwestern Michigan. It is probable, however, that a few individuals may have occasionally been present and mistaken for Crows, as were the two birds shot in this part of the state during the last 7 years.

On October 15, 1932, a juvenile Raven was collected by Mr. George F. Raz at Union Pier, New Buffalo Township, Berrien County, Michigan. Mr. Raz states that it regurgitated a pellet which upon examination proved to consist of a mass of feathers, remains of many Coleoptera, and three feet from some passerine birds. This Raven was skinned by a taxidermist and not sexed. The skin is now in the University of Michigan Museum of Zoology.

Mr. Royal Thayer shot a Raven (*Corvus corax* subsp.) on October 16, 1939, on the south shore of Lake Allegan near Allegan, Michigan (Sec. 14, T. 2 N., R. 14 W., Allegan County). It was given to the Swan Creek Wildlife Experiment Station. The size of this bird is as follows: weight, 1000 grams; arc of right wing, 406 mm; arc of left wing, 408 mm; extent, 1230 mm; tarsus, 63.5 mm; and the culmen, 69.5 mm. Each testis measured 4 mm. The bird's plumage and the persistence of its bursa of Fabricius indicated immaturity. An extreme infestation of ectoparasites was evident.—ARNOLD O. HAUGEN, *Michigan Department of Conservation, Swan Creek Wildlife Experiment Station, Allegan, Michigan.*

The Western Golden-crowned Kinglet in Indiana.—Recently in examining the considerable series of Golden-crowned Kinglets in the U. S. National Museum I found a male of the western race *Regulus satrapa olivaceus* from the vicinity of Mineral Springs (10 miles west of Michigan City), Porter County, Indiana, taken October 26, 1923, by M. W. Lyon, Jr. The bird was caught in a mouse trap baited with bacon. The specimen attracted attention at once by the brighter green of the dorsal surface as it lay in a series of the eastern race, and on closer examination the more slender bill was evident. The wing measures 55.1 mm. and the tail 40.5 mm. I know of no other records for the central states for this bird, and it can only be considered a casual stray in this locality.—ALEXANDER WETMORE, *U. S. National Museum, Washington, D.C.*

Migrant Shrike in Michigan in Winter.—On February 4, 1940, Louis W. Campbell and I found a shrike at the edge of a wooded area on "North Cape," 3 miles southeast of Erie, Michigan. I collected the bird and found it to be *Lanius ludovicianus migrans*, a species not supposed to occur in Michigan in winter. It proved to be an adult male, fat and in good condition in every respect. The bird was nearly black with soot, but when washed it made a handsome specimen, now in the University of Michigan Museum of Zoology.

W. B. Barrows (Michigan Bird Life, 1912) does not record the species in Michigan in winter, although B. H. Swales (*Wilson Bull.*, 15, 1903:21) included it in his list of winter birds of Wayne County, saying he had "seen but two; both in late February." Perhaps Barrows suspected these of being early migrants. There is in addition in the University of Michigan collection an apparently unrecorded specimen taken by J. Claire Wood on Dec. 2, 1906, at Grosse Pointe Farms, Wayne County. It also was an adult male. In the future field observers in southern Michigan will not be able to assume that any shrike seen here in winter "must have been" a Northern Shrike.—J. VAN TYNE, *University of Michigan Museum of Zoology, Ann Arbor, Michigan.*

Incubation Behavior of Lanius ludovicianus in North Dakota.—Additional data gathered at the Shrike nest discussed in an earlier paper (*Wilson Bulletin*, 50, 1938:246–8) may be of interest. This nest, near Jamestown, North Dakota, was begun about May 6, 1937, and the female was first fed by her mate May 10. Beginning May 15 an egg was laid daily through May 20 when the clutch of six was complete. The fourth egg was laid between 7:30 and 9:55 A.M. May 18, and the fifth between 8:15 and 9:25 A.M. the following day.

On May 15, 16 and 19 a bird was found sitting in the nest at 9:30 P.M. (the eggs were warm). At 8:30 P.M. May 17 a bird entered the nest and remained at least until dark, when further watching became impossible.

From May 22 through May 26, 942 minutes were spent watching near the nest. Incubation was abruptly ended May 27 by nest robbers. During this time 767 minutes were spent on the nest by the female, or 81.3 per cent of the time. Incubation periods averaged 23 minutes in length, ranging from 1 to 94 minutes.

Absences ranged from 0.5 to 28 minutes, averaging 5 minutes. Nine times the female left the nest in response to the arrival of her mate with food; 13 times she left independently. The male fed his mate on or near the nest about once in 23 minutes. The food was largely insects. A single impaled English Sparrow (*Passer domesticus*) was found near the nest tree.

The nest was "defended" from other species that came near about once in 20 minutes. Arkansas and Eastern Kingbirds (*Tyrannus verticalis* and *T. tyrannus*) were driven off 34 times, Bronzed Grackles (*Quiscalus quiscula aeneus*) 5, Brown Thrashers (*Toxostoma rufum*) 3, Baltimore Orioles (*Icterus galbula*) 2, and Mourning Doves (*Zenaidura macroura*), Redwings (*Agelaius phoeniceus*) and English Sparrows once each. The Kingbirds' pugnacity and persistence earned them more than their share of attention. Upon a number of occasions Kingbirds even put one or the other of the Shrikes to flight. On May 22 and 25 hostilities were unusually bitter. Bronzed Grackles were quickly and easily repulsed. The 2 or 3 Brown Thrashers continued to feed near the nest tree in spite of attacks. Grackles and Redwings were the most quickly attacked species.

The nest tree was near the northern boundary of the territory so that scarcely a third of the shelter belt in which the tree stood was of interest to the birds. I observed no conflict whatever with a neighboring pair of Shrikes nesting about one half mile south. The territory, mostly grass land and open field, was estimated to be from 20 to 30 acres in extent.—ARCHIBALD JOHNSON, *Jamestown, North Dakota.*

Prothonotary Warbler in Chester County, Pennsylvania.—Early on the morning of May 12, 1936 while making my rounds I heard an unmistakably new warbler song issuing from a sycamore and then from a willow tree in a small swamp near my home in Berwyn. The song was short and very loud. There proved to be three Prothonotary Warblers (*Protonotaria citrea*), two males and one female, all of which I had ample time to identify while the singing male chased the second male from place to place. This species had heretofore eluded me but now brings to 35 the list of warblers I have observed here.—FRANK L. BURNS, *Berwyn, Pennsylvania.*

Red Crossbills Summering in the West Virginia Mountains.—During July and August, 1939, considerable numbers of Red Crossbills (*Loxia curvirostra*) were observed by a number of persons in the Cheat Mountain range in Randolph and Pocahontas counties, West Virginia.

The birds were first noted by Brooks on July 14, when a flock of about thirty, containing red males and birds of greenish-yellow coloration, were seen. On July 22, I. B. Boggs, A. S. Margolin, and Brooks saw a flock of twenty-two birds, and a single individual at different times. In the flock of twenty there were red males, yellowish birds, and streaked juveniles. Sutton, Brooks, and others visited the area on July 29, Sutton remaining for the three following days. A single individual was noted by Miss Laura B. Moore on July 29. On July 30, Sutton shot a dull red male, watched it fall into a dense growth of ferns over an embankment, and spent nine hours searching for the bird, without success. He noted Crossbills flying over several times on July 31. The birds were last seen on August 6, when Margolin and Dean Bowers observed striped juveniles. On subsequent visits by Brooks, Karl Haller, and others, no Crossbills were seen.

All the local observations on Red Crossbills were centered around Gaudineer Knob, a peak of 4445 feet elevation in that part of the Cheat mountain range known as Shaver's Mountain. The dividing line between Randolph and Pocahontas counties follows the crest of the ridge which contains Gaudineer Knob.

The higher parts of the Cheat range are forested by a dense second growth of red spruce (*Picea rubra*), while a swamp at the foot of Gaudineer Knob has a

considerable growth of fir (*Abies sp.*). Near the top of Gaudineer, on a very steep slope, is a small stand of virgin spruce, a part of the locally famous Hamilton "wedge." Here the spruces tower to a hundred feet or more, and it was in the tops of these trees that the Crossbills found the cones on which they fed. In addition to the height of the trees and the steepness of the slopes, a further hindrance to collecting is offered by the dense undergrowth, masses of rhododendron, stunted spruces, and tall ferns in the slight openings.

Since no specimens were secured, it was, of course, impossible to determine the race or races of the Crossbills which we saw. Our purpose in publishing this rather indeterminate record is to call attention to three interesting possibilities which may account for the presence of the birds in the region, a territory in which they have not been previously noted.

1. The birds may have been part of a population nesting somewhere to the north or west.

2. They may have been stragglers from the more or less permanent Red Crossbill population in the mountains of eastern Tennessee.

3. They may have been part of a previously undiscovered permanent population in the Cheat mountains region.

As for the first of these possibilities, it seems unlikely that wanderers from more northern points would have concentrated here without being noted in other regions outside the normal range of the species. If such observations have been made, we have not learned of them.

Consideration must be given to the second possibility. Mr. Arthur Stupka, Park Naturalist of Great Smoky Mountains National Park, (in correspondence) states that during the six months prior to April, 1938, Red Crossbills were plentiful in the spruce-fir zone of that mountain region. He believes that the species bred there during the late winter of 1938. This period corresponded with a particularly heavy cone crop on the evergreens. Since that period, however, the birds have become scarce and scattered, following lighter crops of cones on the spruces and firs. It seems entirely possible that the Crossbills, finding food scarce in Tennessee, moved the few hundred miles north into the West Virginia mountains.

The third possibility is, perhaps, the most plausible of all. The Cheat mountain area is a vast expanse of high county, sixty to seventy miles in length, and eight to ten miles in breadth. All of it lies above 3,000 feet elevation, and there are numerous points above 4,000 feet and up to 4,800. Practically all the higher portions, and many of the lower, are clothed with a dense growth of red spruce, most of it of a size to produce cones.

Only three roads traverse this range in fifty miles of its extent and there are many high peaks which are seldom if ever visited by scientists or field observers. In fact, only within the last few years has the Gaudineer area been made accessible through the construction of a U. S. Forest Service road. It is entirely credible that a small permanent Crossbill population has been overlooked within this wilderness expanse. The presence of streaked juveniles lends support to the idea that the birds may have bred close by. It was impossible to determine whether any of the juveniles had uncrossed mandibles, a point which Griscom (*Proc. Boston Soc. Nat. Hist.*, 41, 1937:114) considers *prima facie* evidence of local breeding.—MAURICE BROOKS, *Division of Forestry, West Virginia University, Morgantown, West Virginia,* and GEORGE MIKSCH SUTTON, *Department of Zoology, Cornell University, Ithaca, New York.*

Upland Plover—a Correction

On page 217 of the December, 1939 *Wilson Bulletin* we made the statement that "Forbush (1912) reports the Upland Plover feeding extensively on crowberries (*Empetrum nigrum*) while in Labrador." This is a misquotation. The statement refers to the Golden Plover.—Irven O. Buss, Madison, Wisconsin.

EDITORIAL

On January 5, 1940 Dr. Lynds Jones, a founder of the Wilson Ornithological Club and for thirty-six years editor of its *Bulletin*, celebrated his seventy-fifth birthday. We are glad to report that he is still actively studying birds and interesting people in ornithology. Dr. Jones holds a unique place not only in our organization but among American ornithologists. In the spring of 1895 he organized at Oberlin the first formal course in ornithology in any American college. He has been training ornithologists continuously ever since. To members of the Wilson Ornithological Club his long record of editing the *Bulletin* is outstanding among his accomplishments, though few of us have the experience to appreciate fully the tireless industry and steady loyalty to an ideal demonstrated by those thirty-six volumes of the *Bulletin*. As Dr. Glover M. Allen once remarked, "No one who has never undertaken something of this sort would have any idea of the amount of blood pressure needed to get out such a journal and avoid the many pitfalls of a printer's work, answer and pacify various contributors and produce a coherent piece of work."

The war in Europe is having a disastrous effect on ornithological work in many parts of the world. The types and many of the more valuable birds in great museums even as far away from the scene of fighting as Paris and London have been packed or even transported to other hiding places and research workers have largely had to give up their efforts to carry on investigations there. We have already heard of the suspension of publication of such journals as "The Bulletin of Animal Behaviour" (London) and the "Scottish Naturalist." There has been no news from our ornithological friends in such storm centers as Finland, Poland, and Czechoslovakia, but we would be relieved to hear that nothing worse had happened to them than the suspension of all of their scientific work.

Ornithological News

Charles M. Pomerat is now with the Department of Biology of the University of Alabama.

Jean Delacour, the well-known French ornithologist, is now in active service as a Captain of Artillery.

The new Museum of Natural History of the University of Minnesota is now completed. The offices are now occupied and the exhibits are being set up in their new cases. The new auditorium, seating 500, was opened with a bird lecture on February 8.

James T. Tanner has just received his Doctor's degree in Ornithology from Cornell University. The title of his thesis is "The Ecology and Life History of the Ivory-billed Woodpecker, *Campephilus principalis*." The investigations for thesis material were made possible by a Research Fellowship of the National Association of Audubon Societies.

M. A. Carriker, Jr., is now in Vera Cruz collecting birds for the Smithsonian Institution.

J. Southgate Y. Hoyt has just received his Master's degree in Ornithology from Cornell University. The title of his thesis is "A Study of the Pileated Woodpecker, *Ceophleous pileatus*."

Alexander Wetmore is Secretary General for the Eighth American Scientific Congress which meets in Washington May 10 to 18. Many papers to be given in Section II, Biological Sciences, will be of great interest to ornithologists.

Carl W. Buchheister has resigned as Secretary-Treasurer of the Massachusetts Audubon Society to become Assistant Director of the National Association of Audubon Societies. His place in Boston will be filled by C. Russell Mason of Sanford, Florida.

WILDLIFE CONSERVATION

TEXAS NATURE FEDERATION GETS RESULTS. Their recent campaign for protection for Brown Pelicans and to defeat a proposed bounty on "Buzzards" brought about the desired results. The bounty proposal was defeated and the Brown Pelican is on the list of birds protected in Texas! Jerry E. Stillwell, Secretary of this organization, reports that the fight will be continued to give protection to woodpeckers and Road-runners.

GAME IMPORTATIONS ON TRIAL. Conservation clubs urge and almost compel game departments to bring cotton-tails, Bob-white, pheasants, wild turkeys, etc., from other states and from foreign places for release in efforts to establish new game species or to stimulate local game populations. Quite a few states are continuing to turn out in northern coverts Bob-whites from the South. Rabbits are brought from tularemia districts and tame turkeys are put into wild turkey ranges. This hit-or-miss policy of game importation for release is now definitely being challenged, not only by students of wildlife management (and this includes many trained officials and staff men), but also by clear-thinking sportsmen and other conservationists. The challenge is based on sound ecology and also on a desire for economy. Ohio wisely uses its surplus of pheasants in Wood County for release in poorer hunting areas. Texas proposes moving deer and wild turkeys from established range to possible new territory, presumably using only native stock. Michigan had poor luck with imported, wild-trapped Hungarian Partridges but established a fine game farm stock by rearing breeders from a few clutches of eggs taken from the nests of wild birds already in Michigan, near the Ohio line. Many more examples of wise and appropriate restocking might be listed; but as yet the local and native stocks and species have been neglected in favor of exotics and outside sources. In commenting on Bob-white restocking practices, Herbert L. Stoddard says: "we always make a point of getting stock from the nearest available source as being probably better adjusted to the environment where we liberate them." Why cannot game officials heed the advice and example of recognized experts?

WILD TURKEYS. From Pennsylvania to Arizona various states are engaged in or are just beginning to think about wild turkey management. This usually takes the form of restrictions on shooting, as in the case of the complete protection recently given these birds by Missouri legislation, and the releasing of captive-reared stocks. In general these methods have not given the expected increases. Some of the difficulties confronting wild turkey restoration have been presented by Harold L. Blakey in the Biological Survey Leaflet No. 77. Wild turkeys thrive best where they are given adequate protection from poaching and where cover and food conditions continue favorable to them. Large acreages under protection favor the survival and increases of wild turkeys as is pointed out in the following note from Herbert L. Stoddard, Director of the Cooperative Quail Study near Thomasville, Georgia:

"One of the oldest and most consolidated groups of private game preserves in the Southeast is located between Thomasville, Georgia, and Tallahassee, Florida; over two hundred and fifty thousand acres being under intensive management for quail, wild turkey, and other game. The northern portion of the preserve area is rather heavily wooded with pine on the uplands and mixed hardwoods along water courses.

"By heavy planting of a year-around food supply (to supplement the uncertain natural 'mast' crops), *moderate* control of a few of the more destructive predators (particularly wild cats and foxes when they become too numerous), and conservative shooting practices, the owners have gradually built up a heavy

stocking of practically pure strain Eastern Wild Turkey. These turkeys have greatly increased in number and extended their territory during the past fifteen years. I estimated that there are between five and ten thousand of these grand birds on the preserves under discussion, while similar groups are being developed under up-to-date management practices near Albany, Georgia, to the north, along the great rivers and coastal section of South Carolina, and at various other points scattered over the deep Southeast. The part being played by private preserves in increasing and maintaining such a species as the Eastern Wild Turkey and in providing large protected acreages for many forms of desirable wildlife is little appreciated by ornithologists as yet, though it is of rapidly increasing significance as far as the South is concerned."

THE PITTMAN-ROBERTSON ACT OF 1937. No seriously interested conservationist should fail to get acquainted with the activities (at least in his own state) under the provisions of this Act which provides for return to the states of the tax on ammunition and firearms, or about $2,750,000 annually. Activities fall into three groups: (1) Land purchase for wildlife rehabilitation, (2) Land development, such as food and cover improvement or water stabilization, and (3) Research directed to the practical solution of problems in wildlife restoration. For the year ending June 1939, four states received as their shares over $45,000: Michigan, Texas, New York and Pennsylvania. Apportionment is on the basis of area and the number of small game licensees. Samples of the projects now approved and under way are given below, as announced from the office of Albert M. Day, in charge of "Pittman-Robertson" work for the U. S. Biological Survey.

1. "*Arizona Inaugurates Statewide Survey.*" The program calls for a wildlife survey to inventory the principal game and furbearing species as a first step in preparation for wiser use of the funds to be available for development and land acquisition.

2. "*Texas Restores Deer and Turkeys*" heads the announcement that this state will use some of its funds to redistribute and restore white-tailed deer and wild turkeys, moving deer from over-populated areas to uninhabited but suitable range. (We hope they will not yield to the too-common practice of stocking "tame" turkeys of mixed or unknown origins.)

3. "*Michigan to Study Sharp-tailed Grouse and Prairie Chicken.*" In less than twenty years the "Sharp-tails" have come from scarcity to abundance in the Upper Peninsula, or at least from obscurity to a position of importance as a game species. Michigan will use "Federal Aid in Wildlife Restoration" funds to make a study of these birds and the Prairie Chicken because very little is known of the factors which limit their numbers, and a management program is needed.

4. "*Illinois Purchases Green River Waterfowl and Upland Game Refuge.*" The Illinois State Department of Conservation has submitted a Federal Aid project for the purchase of an area containing numerous potholes and marshy spots, making it a desirable area for waterfowl, Prairie Chickens, fur-bearing animals, and other forms of wildlife. Future plans call for development of the area as a waterfowl refuge and game management research station. The boundaries will be fenced, an administration building constructed, and a series of small impoundments will be made. The research program will include experiments in game management.

Whether or not the new Federal Aid in Wildlife Restoration program will succeed depends, to be sure, on the choice of projects in each state but it also depends on the support of sympathetic and understanding conservationists, nature lovers as well as shooters. Look into the plans your Conservation Department or Division of Game is developing under its "Pittman-Robertson" or Federal Aid opportunities and form your own opinions.

—WILDLIFE CONSERVATION COMMITTEE
Miles D. Pirnie, Chairman

ORNITHOLOGICAL LITERATURE[1]

HAWKS IN THE HAND. By Frank and John Craighead. Houghton Mifflin Company, Boston, 1939: 6 x 9 in., xiii + 290 pp., 57 plates, $3.50.

It would be unfair to review this book without a prefatory statement regarding its authors, for what might be thought a weakness or two in an ordinary volume become not only understandable, but distinct assets, when their background is known. Briefly then, Frank and John Craighead are twin brothers who are only now of an age to be first-year graduate students at the University of Michigan, but who became interested in falconry and the photographic study of birds of prey so early in life that they have already had an extraordinary range of experience in their field. They have here set down the story from their first boyhood adventures with the Barred Owl and Red-shouldered Hawk on the Potomac River near Washington, through undergraduate days at Pennsylvania State College, to recent vacation trips in western Ontario, Nebraska, and Wyoming. Their approach is entirely direct and straightforward, their literary style extremely simple, the general tone of the book completely and enthusiastically boyish. Since these qualities are exactly what the circumstances call for, they are good.

Although the Craigheads' initial interest seems to have been falconry, they are most widely known for their photographs, and this fact is emphasized by the prominent position given the illustrations in the make-up of the book. Plates without borders are no longer unusual in bird literature, nor is the grouping of all the plates at the back of a volume, but here the publishers have carried innovation one step farther and grouped the borderless illustrations all at the front, so that we have not one but fifty-seven frontispieces. The Craighead photographs are of course excellent, as many critics have long since discovered from seeing them on exhibition, and their reproduction in this particular case is satisfactory if not outstanding. One leaves this subject with the feeling that their unusual position is on the whole a successful publishing device for underlining their importance.

An assay of "Hawks in the Hand" as an addition to scientific knowledge leads to the curious conclusion that its contribution is slight in the obvious field, but may be considerable in a less expected direction. The text is full of information on the habits and life-history of hawks and owls in a state of nature, but these data in no case seem to go beyond what was already known to moderately experienced investigators. The corresponding information on the habits and personalities of the Craigheads' pet birds, however, is unduplicated in American bird literature so far as known to the reviewer, and derives unexpected value not only from its straight-forward accuracy but from the sympathetic understanding with which it is handled. The chapter on Sparrow Hawks, for instance, is well-filled with new and fascinating information which is presented in so beguiling a fashion that the reader's emotions are considerably involved within a very few pages. Bits like this might not be nearly so good had they been written with less of boyish freshness.

Having preserved thus far the objectivity of a proper reviewer, I cannot now resist the impulse to mention one more fine quality of the book from the frankly personal viewpoint of a man who has paralleled a good deal of the Craigheads' experience, notably with Duck Hawks, at twice their age. I am interested at their reaction to the individual personalities of their different pets, at the steps revealed both in and between the lines by which they apparently progressed to an appreciation of the Duck Hawk as the grandest bird of them all; but particularly, I am delighted at the authenticity of all their Duck Hawk material. They do not mention an incident, describe a scene, or feel an emotion in this whole connection which is not depicted with such faithful accuracy that I have seen or felt the identical things.

[1] For additional reviews see pages 29 and 31.

Summing up then, "Hawks in the Hand" is a tip-top boys' hobby-book—so good in fact, that its teaching may be expected to fall here and there on fertile ground, to the end that other parents will presently spend anxious hours as their sons swing on cliffs and survey the country from eagles' nests, and other college landladies will rise in rebellion against the untidy indoor habits of Long-eared Owls.—Joseph A. Hagar.

BIO-ECOLOGY. By Frederic E. Clements and Victor E. Shelford. John Wiley & Sons, N.Y., 1939: 6 x 9 in., vi + 425 pp. $4.50.

This treatise synthesizes the fields of plant and animal ecology as it applies to natural groupings of plants and animals in nature and the relations of organisms to each other and to their environment. As such, the general viewpoint, methods of approach, and factual information are of fundamental importance to all "out-door" zoologists and botanists. Those ornithologists should be particularly interested who are seeking some other basic philosophy than that of the life-zone concept for interpreting the occurrence and distribution of animals; who wish to understand the dynamics of animal populations with respect to competition, territory, migration, feeding, cycles, and interrelations of other sorts; who have observed how habitats and populations change with time but have not fully understood the part played by organisms in producing these changes; and who suspect there is order and unity in the organic out-of-doors but hitherto have caught only fleeting glimpses of possible laws and forces involved. A synthesis of this sort is essential for an understanding of evolutionary processes, although application of these ecological principles to evolution is not a part of this discussion nor the ultimate goal. The ecological system contrasts with and does not supplant the zoogeographical one designed to explain the evolution and dispersal of species.

The basic philosophy of this book is that there are no habitats in which both plants and animals are able to exist in which both do not occur and influence each other. Unit groupings of organisms are communities in which some organisms play a dominant role and other organisms, such as birds, exert influences to a lesser degree. On land, plants are usually dominant, in water, animals. Dominance is shown where organisms receive the full impact of the environment and then modify conditions in such a way that other characteristic organisms usually occur with them and there is some interdependence. The community so reacts upon the habitat as to change it and make possible the invasion of other and different communities, this succession continuing until a final stage or climax is reached, which is relatively permanent. The species composition of the earlier stages must be in large part adjusted to the peculiar conditions of extreme physical habitats and shows some similarity in different climatic regions, but the nature of the climax is determined principally by the climate itself.

In characterizing either seral or climax communities, life-form of plants and life-habitats of animals are of major importance, as plants show adjustment to the environment best by changes in structure, while animals first show it in functions and behavior. The species concept is used, especially in describing communities of subordinate rank, as taxonomic units often agree with the ecological ones and constitute the only practical means for designating particular groups. Since climate is one of the chief environmental complexes to which communities must become adjusted, differences in climax in different geographic regions assume major importance as the basis for a study of geographic distribution. Hence there are the major units, or biomes, of desert, coniferous forest, tundra, deciduous forest, and grassland, not to mention others recognized in water. Each biome in turn may be subdivided into smaller units, associations, and these again into still smaller divisions, based principally on taxonomic composition. It is probably the biome that should receive chief consideration in analysis of bird distribution

upon a continental basis, but the smaller ecological units, both seral and climax, must enter into any analysis of local distribution.

To illustrate in concrete form the general principles and concepts discussed, the grassland biome is analyzed in detail. A map is given to show the limits of the biome and of its various associations. The usefulness of the book and the immediate availability of this whole ecological philosophy to bird students would have been increased if a map showing the location of the other biomes and their major divisions could have been included.

The book is intended for the advanced student and will require careful reading. There will be terms with which he may not be familiar but which are necessary for labeling the concepts. These terms have been held to a minimum and are usually well defined the first time they are used. Probably the student will not everywhere agree. The reviewer believes that the term migration is used in too broad a sense and should be limited to more or less extensive movements from which there is regularly a return, and that other terms, as dispersal or displacement, should be used in referring to one-way movements of various sorts. Then again, territory is not clearly distinguished from home range, the first being a defended area while the latter is not. In the chapter on migration, the discussion of physiological factors and stimuli seems over-expanded, and we miss an analysis of the role of migration in the dynamics of the community life itself.

Aside from the general philosophical treatment, the book is replete with thought-provoking ideas, such as the hypothesis that old age may be responsible for the descending slope of a population cycle. There is a bibliography of about 900 titles with an indication of where each reference is cited in the text. There is an extensive index, and for the more important concepts and terms the page where they are described is indicated in heavy type. We recommend the book for careful study.—S. Charles Kendeigh.

NATURAL HISTORY OF THE BIRDS OF EASTERN AND CENTRAL NORTH AMERICA. By Edward Howe Forbush. Revised and Abridged with the Addition of More than One Hundred Species by John Bichard May. Houghton Mifflin and Co., Boston, 1939: 7½ x 11½ in., xxvi + 554 pp., 97 colored pls. $4.95.

Ornithologists and bird lovers who desire Edward Howe Forbush's relatively expensive and now out of print three-volume "Birds of Massachusetts and Other New England States" may now have much of the text and the magnificent colored plates from paintings by Louis Agassiz Fuertes and Allan Brooks in this one handsome volume. There are complete indices to scientific and common names, an appendix listing "accidental" or "casual" species, and four new colored plates from paintings by Roger Tory Peterson.

Each species is treated individually as before but the detailed information once given under "Description", "Molts", "Field Marks", "Voice", "Breeding", "Range", etc. has either been omitted or radically condensed under four headings: "Identification', "Call" or "Song", "Breeding" and "Range". The delightfully written text under "Haunts and Habits" has been transferred intact, save for a few deletions or changes in wording. Material on species not formerly included is concisely and accurately presented. Dr. John B. May is to be commended for having performed so well this tremendous task of condensation, revision, and abridgment.

The Directors of the Massachusetts Audubon Society have been largely responsible for pressing the demands for the publication of this volume, thus giving to a larger public the literary skill and observations of Forbush and the plates by Fuertes and Brooks. But it is inconceivable that these individuals have been responsible for the sweeping title and utterly false grounds on which the book is advertised. Undoubtedly the publishers are alone to blame for having abandoned good sense for the possibility of larger sales.

"Natural History of the Birds of Eastern and Central North America" is advertised on the front flap of the jacket as containing "the life history and complete, accurate description of every bird to be found east of the Dakotas, Nebraska, and Kansas; it includes Florida to the south, eastern Canada to the north." Actually the life history of no bird in this book is complete. (The former volumes possessed information under "Breeding" that approached completeness.) There are no descriptions—only identification marks are given. The author does not describe nor even treat at all "every bird found east of" the states mentioned. The Eared Grebe, a common dweller of the prairie marshes of Minnesota and Iowa, is relegated to the accidental list. The implied scope of the book insofar as mid-western birds are concerned is not carried out. The Franklin's Gull, Yellow-headed Blackbird, Harris's and Clay-colored Sparrows are discussed ever so briefly in comparison to eastern birds and are not even illustrated. Presumably the publishers deem this book a likely competitor with all treatises on birds of eastern, central, and southern United States but it will be unfortunate if this book cuts into the sales of their excellent and truthfully advertised "Field Guide to the Birds" by Peterson.

The plates by Fuertes and Brooks compare favorably with those of the original work. The four plates by Peterson, however, have been carelessly engraved and do not do justice to this fine artist.—O. S. Pettingill, Jr.

STUDIES OF WATERFOWL IN BRITISH COLUMBIA, NO. 9. BARROW'S GOLDEN-EYE, AMERICAN GOLDEN-EYE. By J. A. Munro. Trans. Royal Canadian Inst., 22, pt. 2, Oct., 1939: 259–318, figs. 1–4, pls. 2–6.

This is not just another paper in economic ornithology; it is a real contribution to the natural history of these waterfowl, based on 20 years' experience and observations. The author describes in detail the ranges, seasonal distribution, courtship and nesting habits; and much space is given to population and food studies. As to identification, the author emphasizes the less elaborate trachea of the drake Barrow's Golden-eye (*Glaucionetta islandica*), and almost entirely yellow bill of the adult female, from February to May. His field identifications of "yearling" females is evidently based on their darker bills. As a rule the adult females of the American Golden-eye (*G. clangula americana*) have much whiter wing coverts than do first year birds, but the author does not discuss wing differences as identification aids for either species. No help is offered in separating the first year hens of the two species. The more tapered bill and larger nail seem to identify most adults and yearlings of the Barrow's, but these bill characters proved variable in a series of ten juveniles from the Cariboo District. (It seems not unlikely that hybrids may occur in the northern part of British Columbia and in southern Alaska where breeding ranges slightly overlap.) The author states his belief that nesting areas are chosen on the basis of good feeding grounds rather than because of available nesting sites.

From examination of 116 stomachs of Barrow's Golden-eye and 80 of the American Golden-eye taken at widely separated and representative waters the author concludes: "The winter food of the American Golden-eye on coast waters appears to be substantially the same, under similar conditions of time and place, as that of Barrow's Golden-eye. While on fresh water both species feed upon salmon eggs, insect larvae, and occasionally small fish. On salt waters they eat crustaceans and mollusks and, for a short time, herring ova." * * * "The destruction of the clear eggs in the early part of the salmon run may represent a drain upon salmon production but of what extent it seems impossible to estimate." As regards the suggestion that local Golden-eyes be destroyed on the grounds that they compete for food with trout wanted by anglers, the author points out that the sandpipers and almost all birds about the lake also compete, and that ducks themselves have value for sport and food, as also do the trout. The paper concludes: "The breeding range of the American Golden-eye is extensive and because of its northern situation

the species is not subject to many of the vicissitudes connected with the propagation of the more southern nesting ducks. For this reason and because of its general abundance there is no immediate danger of any serious reduction in numbers. The situation in respect to Barrow's Golden-eye is quite different. The breeding range is comparatively small and includes much of the settled regions of British Columbia where young birds are shot for food and sport early in the hunting season. Nowhere does the species occur in numbers comparable to those of the American Golden-eye and summer populations may be reduced by drought as is the case with other southern nesting ducks. Thus any general project of control might seriously reduce the population of Barrow's Golden-eye."

No brief review can do justice to this paper. It well deserves careful reading by wildlife managers and other naturalists.—M. D. Pirnie.

TEMPERATURE, GROWTH AND OTHER STUDIES ON THE EASTERN PHOEBE by Dayton Stoner. New York State Museum Circular 22, November, 1939: 1–42, 27 figs.

A study is here reported of growth changes in 20 nestling Phoebes (*Sayornis phoebe*) distributed in 5 nests. An average of 6 measurements per day was made of body temperature, weight, lengths of 7 skeletal elements, and lengths of 4 flight feathers. Dimensions and weights are given of 20 eggs, although there is no indication whether the weights were of fresh eggs. The average size of the sets is given as 5 and the incubation period for 2 sets as 16 days.

The nestling period is divided into an initial interval of 3 days with slow growth, an intermediate period covering 9 or 10 days of vigorous growth, and a final period of 4 or 5 days of retarded or fluctuating growth. Perhaps it is not wholly accurate to say growth is slow during the first 3 days, for on the basis of percentage daily increment, weight, for example, increases 48 per cent per day during this period compared with only 23 per cent during the intermediate period.

Increase in body temperature was most rapid during the first 7 days. Temperature control is said to be established at 10 days although there is no evidence presented for this. The time of establishment of temperature control in young birds is important. This might be approximately determined under field conditions if two sets of readings are taken daily, one as soon as possible after normal brooding periods by the adult, the other after uniform periods when birds are exposed to air temperature. Giving average temperatures for the adult birds based on a few records only and as obtained by mercury thermometers is practically valueless because of the great variability in body temperature of small birds and because of the effect of handling.

Comparisons are made of growth rates in Phoebes with those of Barn and Bank Swallows. These comparisons would be more significant if the amount of variation within the species were better known. More important is the observation that maximum growth of feathers comes after the period of most rapid increase in weight and size, as the energy of the food is diverted from one channel into another. A useful discovery is the uniformity in length of primaries in young birds of the same age. With this knowledge a series of measurements may serve as a basis for the recognition of age.

Some 42 papers are cited in "References" at the end of the paper although only a half dozen or so are referred to in the text and many seem without particular bearing on the subject under discussion.

In general we commend the author for undertaking studies of this sort and hope that other bird students will follow suit. With the accumulation of sufficient data and careful analyses, useful information will become available on developmental processes, comparisons between species, and correlation with bird behavior. —S. Charles Kendeigh.

THE BEHAVIOR OF THE SNOW BUNTING IN SPRING. By N. Tinbergen. Trans. Linn. Soc. New York, 5, 1939: 94 pp., 2 pls., 20 figs. in text.

This is a definitely superior contribution to the subject of territorial behavior of birds and a publication that is of concern to every active worker in this field. Dr. Tinbergen has presented his study in two sections: first, a connected account of activities from the time the Snow Buntings arrive in spring in eastern Greenland to the conclusion of the nesting period, and second, a general discussion of territory, fighting, song, sex recognition and bigamy that centers about the events in the lives of the buntings but is also an effective review to date of the significant contributions on these topics. Not every describer of territorial behavior need attempt so general a report on the field, much as he should be familiar with it, but such a review by a person of Tinbergen's experience and judgment is indeed welcome.

The story of the Snow Buntings is well told, is rich in comparisons with other species, and is illustrated by sketches of significant postures and plumage patterns. Attention is directed especially to the stereotyped response of the territorial male to all strange buntings. Females coming into the vicinity are threatened as are males, and only at close range is a new attitude assumed, serving to display the conspicuous markings of the male. Following pairing, a period of pre-oestrum ensues, with unsuccessful attempts at coition by the male, followed by sexual flights.

In his general discussion, Tinbergen concludes that fighting during or before the formation of sexual bonds serves to secure objects or situations that are indispensable for reproduction The basis for attacking individuals is always sexual rivalry. Sexual fighting therefore serves to defend mate and territory against sexual competitors. The defense of the sex partner tends to prevent the partner from pairing with a second mate. "Like all causal factors that we are isolating from a whole complex of factors, it need not always be absolutely sufficient to prevent bigamy; it only helps establish monogamy." Monogamy in many species seems necessary for successful rearing of the young.

Tinbergen gives his definition of territory as follows: "Whenever sexual fighting is confined to a restricted area, this area is a territory." To avoid confusion with territory in the more general sense, he proposes to designate this type as sexual territory.

The sexual fighting of the female Snow Buntings is only partly connected with territory. The female never shows any knowledge of the exact boundaries of the male's area. The female is much more ready than the male to fight outside the territory, and, in fact, does not show the hesitation that is characteristic of the male in the same situation. The thing that releases sexual fighting in the female is another female that comes too close to the male.

Regarding the food value of territory, Tinbergen, contrary to some recent authors, favors the views of Howard in stressing the area as a food reservoir. Tinbergen thinks that, "it is idle to argue against a food value of the territory in general, and that it is necessary to recognize that there are many species of Passerines to which the territory is necessary to provide *a certain amount* of food. If this function is recognized, it is clear that it is irrelevant to claim that some of the food, or even much of the food, is taken outside the territory. . . ." He also concludes that territorial behavior does serve to prevent overcrowding. "Our only restriction is that the word prevent must not be taken in an absolute sense. As was pointed out before, a function of a biological process may not be expected to be absolute, for every process functions in coöperation with other processes." These opinions concerning the functions of territory find decided favor in the reviewer's mind. By recognizing these functions, there is no need to abandon the view that territory is essential, and was perhaps first important, in setting up and maintaining the sexual bond between members of a pair.—Alden H. Miller.

CANADIAN WATER BIRDS, GAME BIRDS, BIRDS OF PREY.
CANADIAN LAND BIRDS.

Two "Pocket Field Guides" by P. A. Taverner. Musson Book Co., Toronto, and David McKay Co., Philadelphia, 1939; 4½ x 6½ in., 291 pp. and 277 pp. $2.50 each.

These two helpful companion books are, according to the author's own words, introductions to the more detailed "Birds of Canada" from the same pen. The text and illustrations are almost entirely from that work, the new volumes therefore being basically abridgments of it; there is, nevertheless, some new material. The first book listed includes the groups of the current A.O.U. Check-List through the shorebirds, and in addition the owls; the other contains the pigeons, cuckoos, and remaining groups.

In plan bearing a marked resemblance to that of Chester A. Reed's "Bird Guides," the new books differ from them in having a more extensive, interesting, up-to-date and authoritative text and on the whole greatly superior illustrations. These include colored plates from the brush of Allan Brooks, F. C. Hennessey, Ronald Ward Smith (one) and the author. In the two books are only five colored plates (all new with this edition) that illustrate groups of species, most of them showing merely the heads and foreparts. Unfortunately the color reproduction throughout does not equal that in the "Birds of Canada," but this is offset, particularly in the "Water Bird" volume, by the presence of the author's many enlightening black-and-white drawings. Among several Canadian species for which one might expect to find illustration of some kind and does not, are the Ring-necked Duck, Winter Wren, Northern Shrike, and Rusty Blackbird.

Species whose northern limits barely touch the Dominion of Canada are in general treated only briefly or not at all. It seems likely, nevertheless, that the "Water Bird" volume will be about as useful in the northern quarter of the United States as in Canada. Dedicated to sportsmen, upon whom rests in large measure the responsibility for conserving our wildlife, this book supplies information on the present state of scarcity or abundance of many species; and it directs particular attention to those that are largely beneficial to man.

While Roger Tory Peterson's excellent picture gallery and guide, "A Field Guide to the Birds . . . East of the Rockies," is designed alike for beginner and the more advanced, there are some who feel that it is slightly too advanced as an introduction. If this be true, then there will always be a place for guides in the more popular style—such as Reed's and now Taverner's, with a certain stress on identification but with information likewise on habits. Perhaps the perfect, all-purpose guide is an impossibility. Of the two Taverner hand-books, the "Water Bird" one is at least unique in having as its keynote economic status and conservation.—T. D. Hinshaw.

BIRDS IN THE GARDEN AND HOW TO ATTRACT THEM. By Margaret McKenny. Reynal & Hitchcock, New York, 1939: 7 x 9½ in., xviii + 349 pp., text figs., tables, and 48 unnumbered pls. (16 colored, 32 halftone). $5.00.

Here is a book that is probably the best of its kind that has ever been written. It contains not only lucid, authoritative descriptions of methods of attracting birds to several kinds of gardens, of feeding and caring for them under all conditions, and of getting the most out of them in beauty and song, but also much well-chosen and very readable natural history material. Furthermore, it covers a wide field of related topics such as care and feeding of stray birds, migration and banding of birds, handling birds of prey, and photographing birds. The book should prove a good stimulus in designing and arranging one's garden to full advantage for the birds.

Miss McKenny has based her book primarily on northeastern birds and gardens but her chapters on sanctuaries, descriptions of birds, and plants to attract birds have been adapted to all parts of the country. The fact, however, that her book is somewhat regional does not in any way prevent the methods described from being universally applied.

The reviewer finds one bit of rather important information on attracting birds left out of this book, namely, the methods of drawing hummingbirds to gardens by the use of colored vials containing sweetened water. The presence of hummingbirds in gardens contributes greatly to their natural charm and he believes these methods warrant attention because they surpass in effectiveness the more obvious methods of attracting these birds by growing plants with bright blossoms mentioned by Miss McKenny.

The book is illustrated with 16 colored plates from T. S. Roberts' "Birds of Minnesota" and with 32 half-tones largely from photographs. Of course, the colored plates, beautiful as they are, were not originally painted for a garden book; thus the birds are without appropriate backgrounds. Walter A. Weber has designed and painted the jacket especially for this book. It shows a Cardinal in a glorious garden. How short-sighted of the publishers not to repeat this one appropriate color piece elsewhere in the book, thereby making it a permanent part!

There is a detailed table of contents and a list of important references. The text is well indexed but the plates and half-tones are neither indexed nor listed in the front of the book and consequently there is no quick access to this useful illustrative material.—O. S. Pettingill, Jr.

THE BEEPS. THE FLIGHTS AND CRUISES OF THREE MISSOURI TREE SPARROWS. By Virginia Holton. John Day Co., New York, 1939: 6 x 9 in., 192 pp. $2.00.

In "this true account" we are told that the birds followed Lieut. and Mrs. Holton "for nearly 50,000 miles even to the interior of China and back." The story begins in Kansas City where Mr. and Mrs. Beep were in the habit of following Lieut. Holton to the office every day and also of accompanying the Holtons as they drove in the country. Later they followed the Holtons' car to New York City and back; then rode the train to San Francisco; stowed away on the boats to Hawaii and China and thence followed the Holtons in all their wanderings until at last their (The Beeps') descendants accompanied them to New York. These "Tree Sparrows" "married" "Chinese Sparrows" in China and "California Sparrows" and "New York Sparrows" in this country. The Holtons never actually saw the Beeps on the ocean voyage to China, although they searched for them (p. 87); on the return trips the Beeps are apparently assumed to have hidden and fasted for two weeks at a time between ports (p. 190). This was a feat in itself, since Dr. S. C. Kendeigh has found that English Sparrows cannot live more than two days without food.

The adventures in the Far East were most astonishing. The Beeps "told all the neighborhood birds about me" (p. 161) and persuaded a Tailorbird to come along on the cruise from the Philippines to China.

"The psychic Beeps enjoyed the Eucharistic Congress held in Manila. They seemed to sense the spiritual atmosphere . . . The Eucharistic Congress seemed to the Beeps a very fitting thing in that many of the meetings were held just before sundown and the beautiful music of the choir blended in with the Beeps' evening worship" (p. 163).

The Holtons declined to band the Beeps as it would have been "disloyal" to their little friends to do so. They never tell us how they distinguished them from others of their kind, except that Beep (in China) had a tiny white spot on his

forehead. The photographs of the Beeps taken in China show them to be *Passer montanus*.

To return to the start of the story in Kansas City, one small difficulty here is that European Tree Sparrows do not occur in Kansas City. Introduced in St. Louis in 1870, they have never been recorded more than 50 miles west of that city—some 180 miles from Kansas City. The original Beeps must have been English Sparrows and the Beeps in China Chinese Tree Sparrows. The Beeps in San Francisco and New York were English Sparrows, already inhabiting those localities. Apparently wherever the Holtons went they found "Beeps."

This is a fairy story if ever there was one, yet it is presented as fact. "In recording this true story of the Beeps," writes Mrs. Holton, "I have endeavored to confine myself closely to scientific observations and not to let my mind wander into the fertile field of the imagination." (p. 15.) The Holtons seem to believe what they are telling us; they present it as a "beautiful true story of loyalty, courage, and unselfish devotion," with no conception of the amazing claims they are making for physical and mental performance by a sparrow.

The Holtons have various eye-witnesses, but they never exhibited their extraordinary birds to an ornithologist, nor apparently did the publisher ask the advice of any ornithologist. This book has made quite a stir in popular circles. All that is necessary is to point out that the Beeps in this country must have been English Sparrows, since European Tree Sparrows do not occur in Kansas City, and that the Beeps in China were Chinese Tree Sparrows, and the whole story collapses.—**M. M. Nice.**

Field Museum has just published the first two parts of Reuben M. Strong's great "Bibliography of Birds." These two parts, listing about 30,000 titles, complete the author catalogue. A third and final part, now in press, will contain the subject index. A full review will appear in *The Wilson Bulletin* as soon as the publication of the final part makes this possible.

Short Papers

Aldrich, John W. and David C. Nutt. Birds of Eastern Newfoundland. *Sci. Publ. Cleveland Mus. Nat. Hist.*, **4**, No. 2, Dec. 28, 1939: 13–42 (A list of 93 forms found in "eastern Newfoundland" by the junior author or by previous workers. Unfortunately there is no map or definition of what is included in "eastern Newfoundland." Two new forms are described: *Penthestes atricapillus bartletti* and *Turdus migratorius nigrideus*. The paper concludes with a "Bibliography of Newfoundland Birds" of 31 titles, apparently covering the whole of Newfoundland.)

Aldrich, John W. Geographical Variation in Eastern North American Savannah Sparrows (*Passerculus sandwichensis*). *Ohio Jour. Sci.*, **40**, No. 1, Jan., 1940: 1–8. (*P. s. mediogriseus* subsp. nov. named from Andover, Ashtabula County, Ohio.)

Barton, D. R. Apostle of the Birds. The life and times of Frank M. Chapman. *Natural History*, **45**, No. 1, Jan., 1940: 48–51.

Buxton, E. J. M. The Breeding of the Oyster-catcher. *Brit. Birds*, **33**, No. 7, Dec., 1939: 184–93.

Dambach, Charles A. and E. E. Good. The Effect of Certain Land Use Practices on Populations of Breeding Birds in Southwestern Ohio. *Jour. Wildlife Management*, **4**, No. 1., Jan., 1940: 63–76, figs. 1–2, pl. 2.

Davidson, Verne E. An 8-Year Census of Lesser Prairie Chickens. *Jour. Wildlife Management*, **4**, No. 1, Jan., 1940: 55–62, figs. 1–6. (*Tympanuchus pallidicinctus* in western Oklahoma).

DAVIS, WILLIAM B. Birds of Brazos County, Texas. *Condor*, 42, No. 1, Jan., 1940: 81–5, map.

ELLIOTT, JOHN J. Winter Habits of Myrtle Warblers on the South Shore of Long Island. *Bird Lore*, 42, No. 1, Jan.-Feb., 1940: 19–24, 2 photos.

EMLEN, JOHN T. JR. Sex and Age Ratios in Survival of the California Quail. *Jour. Wildlife Management*, 4, No. 1, Jan., 1940: 92–9, figs. 1–3. (*Lophortyx californica*).

FISHER, HARVEY I. The Occurrence of Vestigial Claws on the Wings of Birds. *Amer. Midl. Nat.*, 23, No. 1, Jan., 1940: 234–43, fig. 1.

FITCH, HENRY S. Some Observations on Horned Owl Nests. *Condor*, 42, No. 1, Jan., 1940: 73–5.

FRIED, LOUIS A. The Food Habits of the Ring-necked Pheasant in Minnesota. *Jour. Wildlife Management*, 4, No. 1, Jan., 1940: 27–36, fig. 1.

GABRIELSON, IRA N. The Refuge Program of the Biological Survey. *Bird Lore*, 41, No. 6, Nov., 1939: 325–32, 4 photos.

GERSTELL, RICHARD and WM. H. LONG. Physiological Variations in Wild Turkeys and their Significance in Management. *Pennsylvania Game Comm., Research Bull., No.* 2, 1939 (60 pp., illus.).

GRIFFIN, DONALD R. Homing Experiments with Leach's Petrels, *Auk*, 57, No. 1, Jan., 1940: 61–74, text figs. 1–7.

GRINNELL, HILDA WOOD. Joseph Grinnell: 1877–1939. *Condor*, 42, No. 1, Jan., 1940: 3–34, illus. (Includes a bibliography of the 554 scientific papers of Joseph Grinnell.)

HALLER, KARL W. A New Wood Warbler from West Virginia. *Cardinal*, 5, No. 3, Jan., 1940: 49–52, color plate. (*Dendroica potomac* sp. nov. from Berkeley County, 12 miles south of Martinsburg, West Va. "Superficially similar to *Dendroica dominica*." A male and a female collected.)

HAMERSTROM, FRANCES and OSWALD MATTSON. Food of Central Wisconsin Horned Owls. *Amer. Midl. Nat.*, 22, No. 3, Nov., 1939: 700–702.

HOSKING, ERIC J. Courtship and Display of the Slavonian Grebe. *Brit. Birds*, 33, No. 7, Dec., 1939: 170–73, 5 photos. (*Podiceps* [*Colymbus*] *auritus* in "Scotland.")

HOSKING, ERIC J. Incubation Period of Capercaillie and Precocity of Chicks. *Brit. Birds*, 33, No. 7, Dec., 1939: 198.

HUXLEY, JULIAN S. Notes on the Percentage of Bridled Guillemots. *Brit. Birds*, 33, No. 7, Dec., 1939: 174–83, 1 text fig.

JEWETT, STANLEY G. Hart Mountain Antelope Refuge. *U.S. Dept. Agric. Misc. Public. No.* 355, June, 1939 [copy received Jan. 29, 1940], 25 pp., illus. (Includes a nominal list of 120 species of birds and excellent illustrations of the habitats and fauna.)

JOHNSON, R. A. Present Range, Migration and Abundance of the Atlantic Murre in North America. *Bird Banding*, 11, No. 1, Jan., 1940: 1–17, map.

KALMBACH, E. R. The Crow in Its Relation to Agriculture. *U.S. Dept. Agric., Farmers' Bulletin, No.* 1102. 21 pp., 6 figs.

KENDEIGH, S. CHARLES. The relation of metabolism to the development of temperature regulation in birds. *Jour. Exper. Zool.*, 82, No. 3, Dec., 1939: 419–38, figs. 1–5.

———. In Memoriam: Samuel Prentiss Baldwin. *Auk*, 57, No. 1, Jan., 1940: 1–12, pl. 1.

KLINGERSMITH, STACY. Upland Plover. *Jack-Pine Warbler*, 17, No. 4, Oct., 1939: 92–4, pl. 5.

KUTZ, HARRY L. The Diving Ability of the Black Duck. *Jour. Wildlife Management*, 4, No. 1, Jan., 1940: 19–20.

MCATEE, W. L. A Venture in Songbird Management. *Jour. Wildlife Management*, 4, No. 1, Jan., 1940: 85–9.

McIlhenny, E. A. Sex Ratio in Wild Birds. *Auk*, 57, No. 1, Jan., 1940: 85–93.

Meinertzhagen, R. Autumn in Central Morocco. *Ibis*, 1940, Jan.: 106–136. (Includes a discussion of the relation of humidity and soil color to bird plumage color.)

Miller, Alden H. A Hybrid Between Zonotrichia coronata and Zonotrichia leucophrys. *Condor*, 42, No. 1, Jan., 1940: 45–8, figs. 13–14.

Moreau, R. E. and W. M. Moreau. Observations on Swallows and House-Martins at the Nest. *Brit. Birds*, 33, Nov., 1939: 146–51. (*Hirundo r. rustica* and *Delichon u. urbica*.)

Noble, G. K. and D. S. Lehrman. Egg Recognition by the Laughing Gull. *Auk*, 57, No. 1, Jan., 1940: 22–43, text fig. 1.

Norris, Russell T., John D. Beule, and Allan T. Studholme. Banding Woodcocks on Pennsylvania Singing Grounds. *Jour. Wildlife Management*, 4, No. 1, Jan., 1940: 8–14, fig. 1, pl. 1.

Orr, Robert T. An Analysis of the Subspecific Status of Dowitchers in California. *Condor*, 42, No. 1, Jan., 1940: 61–3, fig. 18.

Sargent, Grace Tompkins. Observations on the Behavior of Color-Banded California Thrashers. *Condor*, 42, No. 1, Jan., 1940: 49–60, figs. 15–17.

Schlag, Carl W. More Hummingbird Notes. *Cardinal*, 5, No. 3, Jan., 1940: 57–65.

Soper, J. Dewey. Local Distribution of Eastern Canadian Arctic Birds. *Auk*, 57, No. 1, Jan., 1940: 13–21, pl. 2.

Stevenson, James O. Two New Birds from Northwestern Texas. *Proc. Biol. Soc. Wash.*, 53, Feb. 16, 1940: 15–18. (*Baeolophus atricristatus paloduro* and *Richmondena cardinalis planicola* subspp. nov. from Armstrong and Randall counties.)

Test, Frederick H. Effects of Natural Abrasion and Oxidation on the Coloration of Flickers. *Condor*, 42, No. 1, Jan., 1940: 76–80.

Twining, Howard. Foraging Behavior and Survival in the Sierra Nevada Rosy Finch. *Condor*, 42, No. 1, Jan., 1940: 64–72, figs. 19–22.

Tiemeier, Otto W. A Preliminary Report on the Os Opticus of the Bird's Eye. *Zoologica*, 24, Nov., 1939: 333–38.

Uhler, F. M. and Stephen Creech. Protecting Field Crops from Waterfowl Damage by Means of Reflectors and Revolving Beacons. *U.S. Biol. Surv., Wildlife Leaflet* BS-149, Nov., 1939, 7 pp. (mimeo.).

Völker, Otto. Gelbes und rotes Lipochrom im Integument der Vögel. *Jour. f. Ornith.*, 87, No. 4, Oct., 1939: 639–43.

Wetmore, Alexander. Observations on the Birds of Northern Venezuela. *Proc. U.S. Nat. Mus.*, 87, 1939: 173–260. (Includes many notes on migrants from North America.)

Wing, Leonard and Millard Jenks. Christmas Censuses: The Amateurs' Contribution to Science. *Bird Lore*, 41, No. 6, Nov., 1939: 343–50, 4 maps, 1 photo.

Worth, C. Brooke. Egg Volumes and Incubation Periods. *Auk*, 57, No. 1, Jan., 1940: 44–60, figs. 1–2. (Egg size is considered to be the chief factor determining length of incubation. Unfortunately much of the data on incubation periods relied on by the author is incorrect. He apparently has not taken the trouble to find modern data on the species he treats. For example, he uses the old 15-day figure for the Spotted Sandpiper although Theodora Nelson in 1930 and Henry Moûsley in 1937 showed the true figure to be 20 to 21 days. The author seems also to have overlooked the classic paper on this subject by Oskar Heinroth, in the *Journal für Ornithologie*, 70, 1922: 172–285. Heinroth pointed out that the Ostrich hatches its egg in 42 days, the same period required by the Gannet for its egg of one-fifteenth the size or Leach's Petrel for its egg of one-fortieth the size.)

Yeager, Lee E. Subjects for Filing Wildlife Literature. *Jour. Wildlife Management*, 4, No. 1, Jan., 1940: 44–54.

PROCEEDINGS OF THE WILSON ORNITHOLOGICAL CLUB

By Olin Sewall Pettingill, Jr., Secretary

The Wilson Ornithological Club held its Twenty-fifth Annual Meeting in Louisville, Kentucky, on November 24–26, 1939. Headquarters and sessions were in the Brown Hotel.

This was the first time in its history that the Club had met in Kentucky. In spite of the fact that the meeting was set ahead one week to follow the unexpected date of Thanksgiving suddenly proclaimed by President Roosevelt, and in spite of the fact that many of the states, including Kentucky, did not follow this proclamation, attendance at the meeting was highly satisfactory.

Short business sessions were held Friday morning and Saturday afternoon. The Executive Council met on the evening preceding the meeting and again Friday evening. There were program sessions morning and afternoon on Friday and Saturday. An excellent photograph exhibit was presented. The exhibit was officially opened on Friday evening by a reception given to the members of the Wilson Ornithological Club by the Kentucky Ornithological Society and the C. W. Beckham Bird Club. Other social gatherings included the Annual Dinner on Saturday evening and several motor trips on Sunday to points of interest in Kentucky.

Business Sessions

President Margaret M. Nice called to order the first business session on Friday morning at 9:30. The minutes of the previous meeting were approved without being read since they had already been published in *The Wilson Bulletin*. The reports of the Secretary, Treasurer, Editor, Librarian, Membership Committee, Endowment Fund Committee, and Wildlife Conservation Committee were read and approved.

A list of persons nominated to membership during the current year was placed on the table for approval by the organization.

The President appointed three temporary committees.
They were:

Resolutions: W. E. Saunders, Amelia R. Laskey, and Lawrence H. Walkinshaw.

Auditing: Wendell P. Smith, Eugene P. Odum.

Nominating: Theodora Nelson, S. E. Perkins, III., J. Southgate Y. Hoyt.

The final business session was called to order at 4:45 Saturday afternoon. Persons nominated to membership during the current year were formally elected.

The Resolutions Committee presented the following resolutions which were then adopted:

Whereas, the Kings River Canyon in California is of outstanding value as a wilderness area, therefore, be it *Resolved,* that the Wilson Ornithological Club urge its establishment at a National Park.

Resolved, that the Wilson Ornithological Club desires to place itself on record as being heartily in favor of protection for all hawks and owls, believing that all of these species have their place in the scheme of nature and that it is a mistake to destroy them.

Resolved, that the Wilson Ornithological Club at its Twenty-fifth Annual Meeting on November 24–26, 1939, in Louisville, Kentucky, hereby tenders its thanks and appreciation to the Local Committee, consisting of Messrs. Brecher, Carpenter, Clay, Young, and Mesdames Schneider and Slack, and especially to its Chairman, Mr. Burt L. Monroe, for their untiring and successful efforts for the entertainment of the Wilson Ornithological Club entailing such careful planning and so much detailed work; be it further *Resolved,* that the Wilson Ornithological Club expresses its thanks to the Local Committee for arranging the splendid exhibit of bird photographs; and be it still further *Resolved,* that the Wilson Ornithological

Club hereby tenders its thanks to the Kentucky Ornithological Society and the C. W. Beckham Bird Club for their kindness to the visiting members of the Wilson Ornithological Club.

The Nominating Committee offered the following report:

President—Lawrence E. Hicks, Ohio Wildlife Research Station, Ohio State University, Columbus, Ohio.

First Vice-President—George Miksch Sutton, Cornell University, Ithaca, New York.

Second Vice-President—S. Charles Kendeigh, University of Illinois, Champaign, Illinois.

Secretary—Olin Sewall Pettingill, Jr., Carleton College, Northfield, Minnesota.

Treasurer—Gustav Swanson, University Farm, University of Minnesota, St. Paul, Minnesota.

Additional Members of the Executive Council—Maurice Brooks, West Virginia University, Morgantown, West Virginia; Miles D. Pirnie, W. K. Kellogg Bird Sanctuary, Battle Creek, Michigan; Lawrence H. Walkinshaw, Battle Creek, Michigan.

The report of the Nominating Committee was accepted by motion and the Secretary was authorized to cast one ballot for the nominees, thus electing them officers of the Wilson Ornithological Club for the ensuing year.

The session was formally adjourned at 5:10 P.M.

Meetings of the Executive Council

The Secretary reported that since 1937 a questionnaire has been submitted to each person elected a member of the Wilson Ornithological Club. This questionnaire is actually the first of three pages originally submitted in 1937 to the entire membership. Since the present supply is running low, the Secretary asked whether it would be advisable to revise this questionnaire to send to all new members during the coming year. The Council thereupon instructed the Secretary to revise the questionnaire.

An interesting discussion was held on the possibility of inviting regional ornithological organizations to affiliate with the Wilson Ornithological Club. Such questions were raised as: How large should such an organization be? What would be its actual relationship to the Wilson Ornithological Club? What would be the benefits of such a relationship? The Council authorized the President to appoint a Committee on Affiliated Societies to study this problem and as soon as possible to submit a report with recommendations to the Executive Council. Maurice Brooks was chosen Chairman of this Committee, with Albert F. Ganier, S. Charles Kendeigh and Myron H. Swenk as the other members.

The Program Committee was encouraged to arrange for the next Annual Meeting a symposium, preferably on some aspect of game management or conservation.

The President asked for comments on the work and effectiveness of the new Wildlife Conservation Committee. It was the concensus of opinion that the accomplishments during the first year of its existence were satisfactory but that the scope of its work should be further increased. There should be more accounts of conservation activities published in *The Wilson Bulletin*. At the suggestion of Miles D. Pirnie, Chairman of the Committee, the Council recommended increasing the size of the Committee to include members from more sections of the country.

The Secretary brought the attention of the Council to a statement in the Constitution that may be interpreted as being contradictory to another statement in the By-laws. In Article III, Section 2, it may be inferred (as a result of the listing of officers of the Club in the preceding section) that the Editor is among the officers to be elected by ballot, whereas By-law 9 states that the Editor shall be appointed by the Executive Council. The Council ruled that the contradiction was undoubtedly an oversight and that Article III, Section 2, of the Constitution

should be corrected to read: "Officers, except the Editor, shall be elected by ballot at the annual meeting by the voting members."

Dr. Josselyn Van Tyne was appointed Editor of *The Wilson Bulletin*. Earlier in the year (in January) the Council had appointed Dr. Van Tyne to this office to fill the unexpired term of Dr. T. C. Stephens.

At the invitation of the Museum of Natural History of the University of Minnesota, the Minneapolis Audubon Society, and the Minnesota Ornithologists' Union, the Council voted to meet in 1940 in Minneapolis, Minnesota, on November 22–23. Sessions will be held in the new Museum building.

Program Sessions

The first program session opened on Friday morning at 9:30 with an address of welcome by the Honorable Joseph D. Scholtz, Mayor of the City of Louisville, and a response on behalf of the Club by President Margaret M. Nice. Other sessions followed on Friday afternoon, Saturday morning and afternoon.

The four sessions included 36 papers, of which only one was read by title. The papers given during the first three sessions were largely technical, being based on the following ornithological studies: life history, 10; distribution and migration, 6; bird behavior, 3; economic, 3; historical, 1; ecological, 2. The conservation programs of the Bureau of Biological Survey and the Hawk Mountain Sanctuary Association and the research program of the Edmund Niles Huyck Preserve were outlined by their respective representatives. The papers given during the fourth session were largely popular in nature, all but one being based on natural color motion pictures of birds. Three concerned expeditions, the remaining four concerned photographic studies of well known birds.

Below is given the program of papers together with brief abstracts:

Opening Session, Friday Morning, November 24.

1. An Unusual Oven-bird Family. (10 minutes).
   H. W. Hann, *Zoology Department, University of Michigan, Ann Arbor, Michigan.*
   (Abstract omitted because this paper is being published in full in the *Bulletin*.)

2. Another Year's Study of Nesting Eastern Bluebirds. (15 minutes).
   Amelia R. Laskey, *Nashville, Tennessee.*
   (Abstract omitted because this paper is being published in full in the *Bulletin*).

3. Winter Studies of Color-banded Chickadees. (Read by Title).
   George J. Wallace, *Pleasant Valley Bird and Wild Flower Sanctuary, Lenox, Massachusetts.*

4. Hawk Mountain Sanctuary Up-to-Date. (15 minutes). Mrs. C. N. Edge, *Hawk Mountain Sanctuary Association, New York, New York.*
   An account of the recent educational and conservational developments at the Hawk Mountain Sanctuary, Drehersville, Pennsylvania.

5. Economic Importance of the Double-crested Cormorant in Minnesota. (15 minutes). Gustav Swanson, *Division of Economic Zoology, University of Minnesota, St. Paul, Minnesota.*
   The examination of over 100 stomachs of the Double-crested Cormorant from Minnesota, together with correlated field studies, show that in the Interior the bird's food habits are more likely to be harmful than on the Atlantic coast. The major foods found in the stomachs examined were fishes usually

considered valuable as food and game fish. In Lake of the Woods the Cormorants interfere to a considerable extent with commercial fishing, and as a result, are much persecuted by the fishermen. A method of controlling the damage to commercial fishing without killing the birds was suggested.

6. A Method of Studying Migration. Illustrated by lantern slides. (20 minutes). J MURRAY SPEIRS, *University of Illinois, Champaign, Illinois.*

(Abstract omitted at the speaker's request since the material is to be used in a doctoral thesis.)

7. Factors Affecting Length of Incubation in Birds. Illustrated by lantern slides. (20 minutes). S. CHARLES KENDEIGH, *University of Illinois, Champaign, Illinois.*

The rates of oxygen absorption and moisture loss by embryos of the House Wren were measured at various stages of incubation and at a wide variety of temperatures. The rate of oxygen absorption and probably the rate of development increase up to 100° F. but not to higher temperatures. Moisture and weight losses also increase to a maximum with rise in temperature, this maximum coming at higher temperatures as development progresses. A 24-hour removal of eggs from the nest and exposure to various temperatures has least effect on hatching at 95° and 100° F. Considering the greater uniformity of response, high percentage of hatch, the average egg temperature in the nest, and the possible stimulation of fluctuating nest temperatures, 95° F. appears the approximate incubation temperatures in this species. Relative humidity in the nest averages about 35 per cent. The length of the incubation period may be determined by the stage of development attained at hatching, the total energy exchanges necessary to reach this stage, and the rate at which these energy exchanges take place.

8. Some Observations on the Mental Capacity of Birds. (15 minutes). ALBERT F. GANIER, *Nashville, Tennessee.*

The extent of the ability of dumb animals, including birds, to associate related observations and to conduct their actions accordingly, has long been a matter of discussion. This paper attributed considerable ability of this kind to birds, within their particular spheres of activity and to a greatly varying degree as between species. Numerous examples from the personal observations of the speaker were cited as proof.

FRIDAY AFTERNOON

9. More Waterfowl? Illustrated by lantern slides. (10 minutes). MILES D. PIRNIE, *W. K. Kellogg Bird Sanctuary, Battle Creek, Michigan.*

A discussion of the following statements: Waterfowl concentrations continue on good refuges. Ducks census methods are unsatisfactory. Waterfowl natural history studies are progressing rapidly under the American Wildlife Institute, Ducks Unlimited, and the United States Bureau of Biological Survey.

10. The Nesting of the Turkey Vulture in Ohio. Illustrated by lantern slides. (20 minutes). VICTOR COLES, *University of Cincinnati Teachers College, Cincinnati, Ohio.*

A detailed presentation of the nesting activities of the Turkey Vulture in the limestone caves of central Ohio. Various types of nesting sites were shown and data given on weight and measurements of eggs and young birds. Measurements were given of young birds from hatching to the time of leaving the nest at 80 days.

11. Species of Birds Described by Alexander Wilson. Illustrated by lantern slides. (15 minutes). LAWRENCE I. GRINNELL, *Laboratory of Ornithology, Cornell University, Ithaca, New York.*

Alexander Wilson was the first who truly studied the birds of North America in their natural abodes and from real observation. He described thirty new species

and subspecies of birds. He ranks ninth among ornithologists in the number of North American species and subspecies first described. His greatest activity was among the Warblers and Fringillids. A number of species, and likewise the genus *Wilsonia* of Bonaparte, were named in honor of him.

Wilson made several expeditions in search of material information and subscribers to his 9-volume publication, "American Ornithology," which he profusely illustrated with his own colored plates. His most extensive expedition was by skiff, horseback, and afoot from Philadelphia to New Orleans.

12. New England's Purple Finch Invasion of 1939. Illustrated by lantern slides. (15 minutes). RICHARD LEE WEAVER, *Dartmouth College, Hanover, New Hampshire.*

A record of the unprecedented invasion of Purple Finches which occurred in New England during the early months of 1939. Data were obtained by banding over 2100 individuals and marking 1000 of them with colored feathers. Returns from an appeal for information made by radio and the Associated Press were also summarized by the speaker.

13. Program of Research at the Edmund Niles Huyck Preserve, Rensselaerville, New York. Illustrated by lantern slides. (10 minutes). EUGENE P. ODUM, *Biological Research Division, Edmund Niles Huyck Preserve, Rensselaerville, New York.*

The E. N. Huyck Preserve, Inc. is a 500-acre tract located 27 miles southwest of Albany. It was set aside with endowment by Mrs. Huyck in memory of her late husband and in recognition of the need for preserving natural areas for recreation, education, and study. Approximately 100 acres comprise two artificial lakes and adjoining marshes, 200 acres in abandoned fields and orchards partly in a natural process of succession, partly with artificial planting. The area is well protected by surrounding territory of a similar nature. A scientific advisory committee has been set up and provisions made for a biological station, a resident biologist, and several summer investigators to devote their full time to research. Work is being planned along broad ecological lines with intensive investigations in many phases of field biology.

14. Ring-billed Gulls of the Atlantic Coast. Illustrated by lantern slides. (20 minutes). HARRISON F. LEWIS, *National Parks Bureau, Ottawa, Ontario.*

This paper was concerned with Ring-billed Gulls in breeding colonies in the northern part of the Gulf of St. Lawrence; the known history, number, situation, and size of such colonies; their protection, food supplies, mortality, and success; habits of the gulls in these colonies and their association with other species; results of banding juveniles in some of the colonies.

15. The Prothonotary Warbler—A Contrast in Nesting Conditions, Tennessee and Michigan. Illustrated by lantern slides. (20 minutes). LAWRENCE H. WALKINSHAW, *Battle Creek, Michigan.*

Some of the data presented in this paper are outlined below:

I. Introduction.
   a. Comparison of regions.
   b. Number of bird-houses in use.
   c. Number of birds observed.

II. Nesting.
   a. Singing of males.
   b. Nesting dates in Michigan and Tennessee.
   c. Egg laying.
   d. Breeding season.
   e. Size of egg sets in Michigan and Tennessee.

III. Survival of young.
   a. Per cent of nest success in Michigan and Tennessee.
   b. Per cent of egg success in Michigan and Tennessee.
   c. Known factors causing destruction of young and eggs.

IV. Some difference in weights.
V. Banding.
VI. Territory.

16. Gathering of the Purple Martins. Illustrated by lantern slides. (20 minutes). EARL G. WRIGHT, *The Chicago Academy of Sciences, Chicago, Illinois.*

An account of clocking the activities of Purple Martins from the time they arrived at the roost until they settled down for the night, and again in the morning when the birds left the roost.

17. Notes on the Development of Song Sparrows and a Cowbird. Illustrated by lantern slides and motion pictures. (30 minutes). MARGARET M. NICE, *Chicago, Illinois.*

Song Sparrows and Cowbirds pass through three stages in the nest and two outside it before reaching independence at the age of four weeks. These are: (1), first 4 days, coordinations largely concerned with nutrition; (2), 5 and 6 days, first appearance of other motor coordinations; (3), 7, 8, 9 days, rapid acquisitions of new motor coordinations; (4), 10 to 16 days, leaving of the nest to attainment of flight; (5), 17 to 28 days, attainment of independent feeding reactions. The majority of passerines seem to attain a certain proficiency in flight at about 17 days and to become independent of parental care at about 28 days.

SATURDAY MORNING

18. Observations on the Feeding and Courtship Activities of the Black Duck. (10 minutes). HARRY LEON KUTZ, *Laboratory of Ornithology, Cornell University, Ithaca, New York.*

Under controlled conditions full-winged Black Ducks dived and secured grain placed in ten feet of water. Both full-winged and captive ducks utilize a method of "treading" to secure food in the shallows. The female Black Duck, both under wild and captive conditions, often assumes the initiative in courtship. In captive ducks, pugnacity of the male stimulates the female sexually.

19. The Breeding Warblers of the Central Appalachian Region. (15 minutes). MAURICE BROOKS, *West Virginia University, Morgantown, West Virginia.*

An ecological survey of the wood warblers which breed in the central Appalachian area, i.e., western Maryland, West Virginia, and western Virginia. It is believed that certain species, Golden-winged and Black-throated Green Warblers, for example, have here adapted themselves to breeding situations which are unique for those species. The distribution of the species also offers considerable support to Merriam's concept of life zones.

20. Roosting Habits of the Robin in Spring. (15 minutes). JOSEPH C. HOWELL, *Laboratory of Ornithology, Cornell University, Ithaca, New York.*

(Abstract omitted because this paper is being published in full in the *Bulletin.*)

21. Some Remarks on the Breeding Birds of the Spruce-Fir Forest in the Great Smoky Mountains National Park. (15 minutes). ARTHUR STUPKA, *National Park Service, Gatlinburg, Tennessee.*

The spruce-fir forests which cover the upper parts of the higher mountains in the southern Appalachian region represent a modified type of Canadian zone. This is revealed by both the floral and faunal complex which prevails. Birds which breed within the limits of this zone in the Great Smoky Mountains National Park were discussed. Observations covered a period of four years.

22. Sex Ratio in Shorebirds. (10 minutes). JOSSELYN VAN TYNE, *Museum of Zoology, University of Michigan, Ann Arbor, Michigan.*

A discussion of the little information available on the sex ratio of shorebirds. Large numbers must be checked to ascertain actual sex ratios of bird species. In the case of birds whose sexes are alike in plumage, hunter's bags or museum series are the main source of information. Since there seems to be no selection of one sex or the other in museum collecting of some of these species, the study of such series seems to be a proper method of determining the sex ratio. It was found, for instance, that 22 large North American museums contain 1,137 Wilson Snipe (*Capella delicata*) with full data, taken at all seasons and in all parts of the range. Of these, 654 were males and 483 females, or 135.4 males to 100 females.

23. Observations on the Nesting Habits of the Phoebe. (10 minutes). WENDELL P. SMITH, *Wells River, Vermont.*

Information on the time interval between arrival of the species and arrival of breeding individuals; mating; nest building; egg laying; incubation; care of young; growth rates and color changes in young; nest leaving; subsequent behavior of parents and young.

24. Recent Developments in Waterfowl Lead-Poisoning Investigations. (15 minutes). GUSTAV SWANSON, *Division of Economic Zoology, University of Minnesota, St. Paul, Minnesota.*

Experimentally it has been shown that a sub-lethal dose of lead poisoning may have an injurious effect upon the egg-laying capacity of Mallards. The fertility of the eggs laid, however, was not affected in the experiments.

Surveys of a number of lake bottoms in Minnesota have revealed that a large number of shot are usually available in any lake over which a considerable amount of shooting has taken place. Such lead shot has been shown to remain close enough to the surface of the lake bottom to be accessible to ducks even on refuge lakes which have been closed to hunting for five years.

25. The Present Status of the Conservation Program of the Bureau of Biological Survey. (15 minutes). W. C. HENDERSON, *Bureau of Biological Survey, Washington, D.C.*

A discussion of three aspects of the work of the Bureau: research projects; enforcement of the Bird Treaty Act; the installment of new measures according to the stipulations of the Pittman-Robertson Act.

26. Incubation Studies of the Yellow-headed Blackbird. Illustrated by lantern slides. (20 minutes). REED W. FAUTIN, *University of Illinois, Champaign, Illinois.*

During the summer of 1937 observations were made on the nesting activities of two colonies of Yellow-headed Blackbirds. One hundred and twenty-seven nests were investigated. Data were kept on 83 nests from the time the first egg was laid until the young hatched. Information was obtained on the length of the incubation period; attentiveness and inattentiveness of incubating females at various times during the day and at various parts of the incubation period; behavior of females and males during incubation; causes of nesting failures.

27. Bird Distribution and Biomes in Western Canada. Illustrated by lantern slides. (20 minutes). EUGENE P. ODUM, *Biological Research Division, Edmund Niles Huyck Preserve, Rensselaerville, New York.*

Bird life of deciduous forest, northern coniferous forest, mountain coniferous forest, tundra, and grassland were compared from observations made during the 1939 summer field trip in animal ecology conducted by the Department of Zoology, University of Illinois, under the leadership of Dr. V. E. Shelford. The trip covered more than 6,000 miles, north as far as Churchill and west to the Canadian Rockies. The varying roles of cover (habitat) and climate in controlling distribution were discussed in the consideration of the life zone and biome theories as they apply to the area traversed. It is important to consider abundance and necessary to distinguish between (1) climax

and sub-climax, (2) primitive and disturbed conditions in evaluating observations and theories.

28. Studies of the Life History of the Pileated Woodpecker. Illustrated by lantern slides. (20 minutes). J. Southgate Y. Hoyt, *Laboratory of Ornithology, Cornell University, Ithaca, New York.*

A report on three years study of the life history of the Pileated Woodpecker. Data were represented on the winter and summer ranges of a pair of birds; the year-round activities, courtship, nesting, habits, development and growth of young and post-nesting activities of a pair observed in the vicinity of Ithaca, New York. Presented for the first time were daily observations made throughout the period the young were in the nest and also observations made on a young bird reared in captivity.

29. The Mockingbird's Imitation of Other Species. (15 minutes). George R. Mayfield, *Vanderbilt Universtiy, Nashville, Tennessee.*

A statistical study of imitations of other species by the Mockingbird. Included were many records by the same bird and songs from Mockingbirds in various parts of the United States. It was established that nearly one-eighth of the Mockingbird's imitations are songs of the Carolina Wren; one-twelfth of the Blue Jay; one-fourteenth of the Cardinal, etc. The question of inherited song was treated.

Saturday Afternoon

30. Michigan Bird Life. Illustrated by motion pictures in natural color. (20 minutes). Parks Allen, *Ithaca, Michigan.*

A series of motion pictures in color of Kirtland's Warbler, Song Sparrow, Sandhill Crane, Yellow Warbler, Goldfinch and others.

31. Birds of Florida. A Natural Color Motion Picture Record of Birds Taken by the Charles F. Williams-Cincinnati Museum of Natural History Expedition. (20 minutes). Peter Koch, *Terrace Park, Ohio.*

A motion picture record of a month's bird-photographing expedition in Florida. Members of the expedition included Karl H. Maslowski, Woodrow Goodpaster, and the speaker.

32. Some Birds of Eastern Kentucky. Illustrated by motion pictures in natural color. (20 minutes). Wilfred A. Welter, *State Teachers College, Morehead, Kentucky.*

A series of portraits of birds in the mountainous section of Kentucky. Among the birds shown were Bewick's Wren, Hooded and Blue-winged Warblers, Yellow-breasted Chat, Meadowlark, and Acadian Flycatcher.

33. Adventures in Color with American Birds. Illustrated by motion pictures in natural color (30 minutes). Cleveland P. Grant, *Baker-Hunt Foundation, Covington, Kentucky.*

Outstanding motion pictures of Snow Geese in migration, courtship of the Ruffed Grouse and Prairie Chicken, and the nesting of a pair of Baltimore Orioles.

34. Ruby-throated Hummingbird and Wild Turkey. Illustrated by motion pictures in natural color. (20 minutes). Olin Sewall Pettingill, Jr., *Carleton College, Northfield, Minnesota.*

Picture studies of several hummingbirds obtaining food from artificial feeding devices at the Laurence J. Webster estate in Holderness, New Hampshire, and the nesting of a pair of hummingbirds near the University of Michigan Biological Station at Douglas Lake, Michigan. Also picture studies of wild Turkeys making periodical visits to feeding stations on Herbert L. Stoddard's Sherwood plantation in Georgia.

35. The 1939 Semple Expedition to Eastern Mexico. Illustrated with several paintings by the speaker. (30 minutes). GEORGE MIKSCH SUTTON, *Laboratory of Ornithology, Cornell University, Ithaca, New York.*

In March, April, and May, 1939, John Bonner Semple and George Miksch Sutton returned to Mexico, accompanied by Thomas D. Burleigh of the U. S. Bureau of Biological Survey. They visited seven states. In April they were joined by Frederick S. Loetscher, graduate student of Dr. Sutton's at Cornell. They made a survey at exactly the point visited by Frank M. Chapman in 1897. Their principal objective was the rediscovery of *Otus pinosus.*

36. Western Arctic Birds in Color. Illustrated by motion pictures in natural color. (20 minutes). CHARLES E. GILLHAM, *U. S. Bureau of Biological Survey, Edwardsville, Illinois.*

Motion pictures of birds taken on a trip sponsored by the Bureau of Biological Survey to northwestern Canada and the delta of the Mackenzie River. Excellent shots were obtained of Hudsonian Curlews, Northern Phalaropes, and various arctic breeding waterfowl.

THE BIRD PHOTOGRAPH EXHIBIT

An excellent Bird Photograph Exhibit was arranged in the South Room on the mezzanine floor of the Brown Hotel. This exhibit displayed camera work by members of the Wilson Ornithological Club and clearly showed the interest taken in photography by the organization. Each exhibitor was limited to three black and white photographs not less than 8″ x 10″ in size and three natural color photographs not less than 4″ x 5″ in size. A mimeographed list of the exhibitors was provided and the pictures were attractively placed on large, upright wall-boards.

One hundred and forty bird photographs were shown, the subject matter ranging from pictures of nests and young to enormous colonies of water-birds. Especially fine were numerous photographs of birds in flight, three natural color pictures of birds, and several black and white transparencies against artificial lighting.

Photographs were exhibited by the following members:

Cyril E. Abbott
Bernard W. Baker
Floyd S. Carpenter
Victor Coles
David Damon
Edward Fox Dana
J. C. Dickinson, Jr.
Adrian C. Fox
Albert F. Ganier
Charles E. Gillham
Woodrow Goodpaster
A. Haak
Harry W. Hann
D. Ralph Hostetter
J. Southgate Y. Hoyt
Allen Kain
Peter Koch
Karl H. Maslowski
Amos I. Means
Henry Mousley
Olaus J. Murie
Ralph S. Palmer
Miles D. Pirnie
Olin Sewall Pettingill, Jr.
Henry J. Rust
Evelyn J. Schneider
Thomas G. Scott
Mabel Slack
J. Murray Speirs
Henry O. Todd, Jr.
Ivan R. Tomkins
Jack Van Coevering
Lawrence H. Walkinshaw
Edward H. Wollerman

The Bird Photograph Exhibit was officially opened on Friday evening by a reception given to the members of the Wilson Ornithological Club by the Kentucky Ornithological Society and the C. W. Beckham Bird Club. Entertainment was "in good old Southern style!" Members not only had opportunity to study the Exhibit but to make the acquaintance of many Kentucky ornithologists.

The Annual Dinner

The Annual Dinner of the Wilson Ornithological Club, attended by 137 members and visitors, was held in the Crystal Ballroom of the Brown Hotel on Saturday evening. This dinner will be remembered as a notable occasion in the history of the Wilson Ornithological Club, for on this occasion the Club first attained a membership of *one thousand*. Vice-President Hicks, long an ardent campaigner in behalf of Club membership, announced that enrollment in the organization stood at 992, that the 1000 mark was tantalizingly near, and that this dinner would be an appropriate occasion on which to reach it. He thereupon asked for pledges and the responses were immediate.

The speaker at the dinner was Mr. Karl H. Maslowski of Cincinnati, Ohio, who showed his beautiful natural color motion picture film entitled: "Nature's Children." Remarkable were his close-up shots depicting the eating habits of a praying mantis, and likewise his camera studies of red foxes and chipmunks.

Excursions

On Sunday four motor trips were made to points of interest in Kentucky, the transportation being provided for all members. At least twenty-five members availed themselves of this opportunity.

Attendance

Registration showed the presence of 168 persons.[1] Of these 100 were members, 12 were Councillors, 4 were Past-Presidents. Dr. Lynds Jones was the only Founder present. Those members who came great distances to attend the meeting were Harrison F. Lewis of Ottawa, Canada, W. E. Saunders of London, Ontario, Richard L. Weaver of Hanover, New Hampshire, Wendell P. Smith of Wells River, Vermont, Miss Hedvig Swanson of Macon, Georgia, and Miss Fannye A. Cook of Jackson, Mississippi.

Altogether 15 states, the District of Columbia, and the Dominion of Canada were represented in Louisville. Naturally the state where an Annual Meeting is held provides the largest attendance. So this year Kentucky had the largest number present: 18 members and 34 visitors.

This is the first time that Kentucky has taken the lead in attendance at an Annual Meeting although it was second only to Indiana at the Indianapolis meeting in 1937. Next to Kentucky the state with the largest attendance was Michigan with 16 members and 6 visitors.

The list of members in attendance follows:

From **Georgia:** 1—Miss Hedvig Swanson, Macon. *Visitor,* 1.

From **Illinois:** 14—Mrs. M. M. Nice, C. O. Decker, L. B. Nice, Miss J. C. Duer, Chicago; R. W. Fautin, Mrs. D. H. Speirs, J. M. Speirs, Urbana; K. E. Bartel, Blue Island; S. C. Kendeigh, Champaign; L. G. Flentge, Des Plaines; C. E. Gillham, Edwardsville; C. A. Beckhart, Barrington; C. W. G. Eifrig, River Forest; Miss Maxine Smith, Rockford. *Visitors,* 3.

From **Indiana:** 5—S. E. Perkins, III, Miss M. F. Campbell, Miss C. A. Moore, Miss Dorothy Hover, Miss M. R. Knox, Indianapolis. *Visitors,* 5.

From **Kentucky:** 18—J. B. Young, Miss Emilie Yunker, W. M. Clay, H. B. Lovell, B. L. Monroe, F. S. Carpenter, L. C. Brecher, James LaFollette, Miss

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[1] This figure places the Louisville meeting fifth largest attendance, being exceeded in total registration by the 1939 Ann Arbor meeting (261), the 1937 Indianapolis meeting (238), the 1929 Des Moines meeting (202) and the 1934 Pittsburgh meeting (178). However, had registration been taken during the last session of the Louisville meeting when 400 persons were estimated as present, the meeting would have undoubtedly equalled, if not exceeded, the Ann Arbor meeting of last year.

Mabel Slack, Miss E. J. Schneider, Louisville; J. F. Spears, V. K. Dodge, Miss C. C. Counce, Lexington; C. P. Grant, Covington; Mrs. J. H. Mayer, Cynthiana; W. A. Welter, Morehead; Miss Edith Pearson, Miss Hazel Kinslow, Paducah. *Visitors,* 34.

From **Michigan:** 16—Mrs. George Burch, L. H. Walkinshaw, M. D. Pirnie, G. N. Rysgaard, Peter Ward, E. M. Brigham, Jr., Battle Creek; Miss M. E. Gross, Grand Rapids; Miss Katherine Merry, R. E. Olsen, Pontiac; J. Van Tyne, H. W. Hann, J. L. George, Mrs. R. L. Kahn, Ann Arbor; Mrs. G. A. Kelley, Detroit; Parks Allen, Ithaca; B. W. Baker, Marne. *Visitors,* 6.

From **Minnesota:** 4—O. S. Pettingill, Jr., Northfield; Gustav Swanson, St. Paul; Mrs. C. E. Peterson, Madison; Mrs. E. O. Wilson, Montevideo. *Visitors,* 2.

From **Mississippi:** 1—Miss F. A. Cook, Jackson.

From **New Hampshire:** 1—R. L. Weaver, Hanover.

From **New York:** 9—Miss Theodora Nelson, Peter Edge, Mrs. C. N. Edge, New York City; H. L. Kutz, J. C. Howell, L. I. Grinnell, G. M. Sutton, J. D. Webster, Ithaca; E. P. Odum, Rensselaerville. *Visitors,* 4.

From **Ohio:** 11—Mrs. C. H. Warner, L. E. Hicks, Columbus; Lynds Jones, Oberlin; Peter Koch, Victor Coles, Allan Kane, K. H. Maslowski, Gordon Acomb, Cincinnati; Miss Vera Carrothers, Miss M. E. Morse, Miss Isabella Hellwig, Cleveland. *Visitors,* 6.

From **Pennsylvania:** 3—R. W. Glenn, G. B. Thorp, Miss M. L. McConnell, Pittsburgh. *Visitors,* 4.

From **Tennessee:** 8—Mrs. A. R. Laskey, J. B. Calhoun, H. C. Monk, A. F. Ganier, G. R. Mayfield, Nashville; W. M. Walker, Jr., Henry Meyer, Knoxville; Arthur Stupka, Gatlinburg.

From **Vermont:** 1—W. P. Smith.

From **Virginia:** 2—D. R. Hostetter, Harrisonburg; J. S. Y. Hoyt, Lexington.

From **West Virginia:** 3—I. B. Boggs, Maurice Brooks, Morgantown; W. A. Lunk, Fairmont.

From **Washington, D.C.:** 1—W. C. Henderson.

From **Dominion of Canada:** 2—H. F. Lewis, Ottawa, Ontario; W. E. Saunders, London, Ontario.

Summary of Attendance: Total registration, 168 (Members, 100; Visitors, 68); Total from Louisville, 39 (Members, 10; Visitors, 29); Total from Kentucky, 52 (Members, 18; Visitors, 34). Total outside of Kentucky, 116 (Members, 82; Visitors, 34). Maximum number at each program session: Friday morning, 55; Friday afternoon, 80; Saturday morning, 95; Saturday afternoon, 400. Number at Annual Dinner, 137. Number of persons in group photograph, 111.

REPORT OF THE INDEX COMMITTEE

As it was deemed advisable not to recommence work on the index until further investigation had been conducted on apparently important improvements in indexing policies, progress the past year consisted mainly of these researches, and also in very fruitful conferences with Messrs. Strong, Kalmbach, and Van Tyne, in some correspondence on policy, and in the formulation of a policy sheet for the use of indexers. The studies having been completed, actual indexing is now going forward. Miss Phoebe Knappen has undertaken to finish the author-title indexing, and the chairman is now engaged in personally preparing a complete index, with all cross references, to a recent volume. This will serve as a final test of the adequacy of our system.

The Club owes a debt of gratitude to Mrs. Nice, to Dr. Strong, who retired last November as chairman of the committee, and to Dr. Van Tyne, who served in the same capacity in the interim. Their guidance and encouragement in furthering this undertaking have been invaluable.

Respectfully submitted,

THOMAS D. HINSHAW, *Chairman*

December 31, 1939.

REPORT OF THE MEMBERSHIP COMMITTEE

In accordance with Dr. Olin Sewall Pettingill, Jr.'s, 1938 secretarial report to the Wilson Ornithological Club, the suggestions regarding membership solicitation were placed in effect.

In late February, 1939, letters were sent by Mrs. Margaret M. Nice, President, and your Membership Chairman to prospective State Chairmen. The response to these letters was good and the following State Chairmen were appointed:

California—John T. Emlen, Jr.
Colorado—Gordon Alexander
Georgia—H. C. Jones
Illinois—Frank Bellrose, Jr.
Indiana—Fred Thomas Hall
Kentucky—Robert M. Mengel
Michigan—Lawrence H. Walkinshaw
Minnesota—Kenneth D. Morrison
Mississippi—Miss Fannye A. Cook
Missouri—William Jenner
New England—Richard L. Weaver
New Jersey—Alfred E. Eynon
New Mexico—Lawrence V. Compton
New York—Mrs. Olive R. York
North Dakota—Miss Perna M. Stine
Ohio—Karl H. Maslowski
Oklahoma—Miss Edith R. Force
South Dakota—Philip A. DuMont
Tennessee—Albert F. Ganier
Texas—J. E. Stillwell
Utah—W. H. Behle
Virginia—J. Southgate Y. Hoyt
Washington—Vernon L. Marsh
West Virginia—Maurice Brooks
Wisconsin—G. A. Ammann
Wyoming—Otto McCreary
British Columbia—Walter S. Maguire

The first drive for members got under way in April and ended in June. The second drive began in September and has lasted until the present day.

Much of the work, naturally, has been on an experimental basis. Letters were sent in three forms:

(1) Printed letters (not mimeographed) to persons from large lists, presumably interested in birds in general.
(2) Printed letters to individual groups such as bird-banders, wildlife refuge workers and game managers. Each of this series pertained to the particular work of each group and was not general.
(3) Personally written letters to individuals where the occasion warranted.

It can be seen readily that to write personal letters to persons taken from lists would entail considerable expense both in regard to postage and to secretarial help. It is the opinion of your Membership Committee that the new folder describing the Wilson Club and its objectives, designed by Dr. Pettingill, is by far the greatest drawing power to prospective members since it tells the entire story practically without the aid of an additional letter. Every letter sent out contained one of these folders. Many select lists of prospective members have been used during the past year.

Approximately 3,500 persons have been circularized. One hundred and ninety-four members have been obtained.

It is significant that many persons receiving the folders and an invitation to join the Club sent in their applications at a much later date. The last application received by your committee just a few days ago was from the very first series of names circularized last April.

The actual cost of solicitation by the Membership Committee has been confined entirely to the cost of supplies and to postage. No additional secretarial help has been used to date.

Whatever success has been attained has been due chiefly to the careful plans made by your officers, to the new folder, and to the splendid cooperation of the State Chairmen and individual members who sent in names of prospective members.

Respectfully submitted,

BURT L. MONROE, *Chairman*

November 24, 1939

REPORT OF THE SECRETARY FOR 1939[1]

In the Annual Letter I stated that I would have a happy announcement to make concerning the membership status of the Wilson Ornithological Club. Indeed, I now have! This year we lost only 93 members as against 127 members last year: 61 were delinquent in dues; 26 resigned; 6 were taken by death. Thirteen former members rejoined the Club and we have obtained 253 new members *giving us a total of 1044 members*. Thus we have made a net gain in membership over last year of 173 members.

Our membership, while most heavily distributed in the midwestern states, is rapidly becoming country-wide. Ohio and Michigan are tied for first place in greatest number of members, with Illinois following a close second. But it is gratifying to note the decided increase in numbers of members in New England, Pennsylvania, New York, and Texas.

The total distribution of members by states, provinces, and foreign countries is given below. The figures in parentheses indicate the number of members new to the organization in 1939.

UNITED STATES		
Arizona	8	(3)
Arkansas	5	(1)
California	49	(8)
North Carolina	6	(3)
South Carolina	5	(2)
Colorado	11	(4)
Connecticut	8	(3)
North Dakota	12	(5)
South Dakota	6	
Delaware	2	
Florida	10	(3)
Georgia	13	(3)
Idaho	3	
Illinois	86	(20)
Indiana	31	(6)
Iowa	38	(4)
Kansas	4	(2)
Kentucky	25	(11)
Louisiana	8	(2)
Maine	6	(1)
Maryland	13	(3)
Massachusetts	28	(5)
Michigan	96	(23)
Minnesota	41	(17)
Mississippi	6	(2)
Missouri	25	(7)
Montana	5	(3)
Nebraska	14	(2)
New Hampshire	5	(2)
New Jersey	17	(5)
New Mexico	8	(3)
New York	75	(18)
Ohio	96	(14)
Oklahoma	15	(5)
Oregon	5	
Pennsylvania	51	(14)
Rhode Island	2	(2)
Tennessee	19	(4)
Texas	29	(11)
Utah	8	(2)
Vermont	1	
Virginia	14	(1)
West Virginia	13	(3)
Washington	7	(2)
Washington, D.C.	30	(2)
Wisconsin	29	(6)
Wyoming	7	(2)
CANADA		
Alberta	1	(1)
British Columbia	3	
Manitoba	5	(2)
Nova Scotia	1	
Ontario	21	(4)
Quebec	3	
Saskatchewan	1	
FOREIGN COUNTRIES		
Alaska	2	(2)
China	1	(1)
Cuba	1	
Finland	1	
Great Britain	2	(2)
Holland	1	
New Zealand	1	
Northern Rhodesia	1	(1)
Peru	1	
Switzerland	1	(1)
Venezuela	1	
Virgin Islands	1	

The 253 new members are classified as follows: Sustaining, 5; Active, 30; Associate, 218. The total membership is classified as follows: Honorary, 5; Life, 7; Sustaining, 39; Active, 234; Associate, 748.

[1] Revised through December 31, 1939.

Our record gain in new members that brings us for the first time in the Club's history up to and beyond the one-thousand mark has been due partly to the continued efforts of the Secretary with the cooperation of his fellow officers, but chiefly to the persistent work of the Chairman of our new Membership Committee. During this meeting the chairman of that committee will speak to you and will, I hope, describe his unique committee and methods of procedure. I cannot say whether he will give you any indication of the amount of correspondence that has been involved, the great time and energy that the work has required, and the great personal burden that it has been to him. But whatever his remarks may be, we have sufficient imagination to realize how greatly we are indebted to him.

This year our membership solicitation work has been greatly facilitated by the publication of an attractive membership solicitation folder. Several copies are available for examination purposes at the Registration Desk. I should advise each one of you to study this folder. You may learn much about the Wilson Ornithological Club that you do not yet know. While this folder has been issued by the Club at considerable initial expense, it is in a way a permanent acquisition. Its entire form is being kept in a Northfield, Minnesota, printing house and additional copies may be run off from it when needed.

Possibly it may interest you to know that each person elected to membership is formally notified by the Secretary. At the same time he is asked to fill out a copy of the questionnaire similar to the one submitted to the entire membership in 1937. Thus we in charge of the Club continue to keep ourselves informed of our membership and to know who our members are.

The Local Committee is to be congratulated on the fine Bird Photograph Exhibit. I hope that members in attendance will appreciate the great personal expenditure of time and money that this Exhibit has meant to the Local Committee. Please repay the Committee by studying this Exhibit carefully during your spare moments.

As Chairman of the Program Committee, may I solicit criticisms and suggestions pertaining to the present program, its arrangement, scope, and general content. While it is now too late to make radical changes, nevertheless such expressions of opinion will guide us in making up the program in years to come.

Respectfully submitted,

OLIN SEWALL PETTINGILL, JR., *Secretary*

November 24, 1939

REPORT OF THE WILDLIFE CONSERVATION COMMITTEE

Just a year ago we presented the first annual report of this Committee. Events of the past year indicate that the wildlife conservation activities suggested then were fairly appropriate and possible of accomplishment.

The September issue of *The Wilson Bulletin* presented more than a page of wildlife conservation notes with an announcement from the Editor that summaries of information gathered will be printed regularly together with the recommendations of the Committee. Members are invited to contribute data and opinions.

Plans for a conservation symposium for this meeting failed, but your Committee recommends an expression of views and suggests a symposium for the next meeting of this Club.

During the past year the committee members have exchanged views on legislative and educational programs and have begun plans for an inventory of conservation activities in all states. In developing our conservation program it is not only necessary but also is very desirable to have more members actively participating in local programs and in helping the Committee learn of the needs and progress in wildlife affairs throughout the country.

The Committee urged the Department of the Interior to continue all possible protection for waterfowl and received a reassuring letter from Chief Gabrielson. Needs for increased protection are now being studied by the Biological Survey and your Committee.

Among suggestions received from committee members and on which I wish your reactions are the following:

That a list of Conservation workers be prepared for each state, indicating which are Wilson Club members. (Each list might in part be compiled from the Secretary's questionnaire of 1937.)

It is urged that we "go slow" in arriving at conclusions and in making recommendations, but there is no need for going slow in promoting natural history inventories which are the only sound basis of wildlife conservation. We especially need data on rare species and on those which are vulnerable because of colonial nesting or extreme pressure from hunters.

In addition to participation in various parts of our program we urge members who can give financial aid to do so. Studies such as the three-year study of the California Condor are deserving of help. Contributions can also be used to good advantage in promoting interest in wildlife conservation.

Again let us remind you that the success of the Wilson Club Conservation Committee section of the *Bulletin* depends not only on the Editor and your Committee but depends also on each of you and your contributions of conservation news. To be of lasting benefit, either to the birds or to the people who are to enjoy them, a sound conservation program must develop slowly but steadily. We rely on you.

Respectfully submitted,

MILES D. PIRNIE, *Chairman*

November 25, 1939

WILSON ORNITHOLOGICAL CLUB LIBRARY

Recent gifts are as follows:
Ralph Beebe—5 pamphlets, 5 periodicals.
Paul Errington—6 pamphlets.
W. C. Legg—current numbers of "Field Ornithology."
Marius Morse—2 pamphlets.
National Park Service—1 book.
Margaret M. Nice—1 book, 3 pamphlets, 54 periodicals.
Schenectady Bird Club—Nos. 1 to 7 of "Feathers."
O. A. Stevens—1 pamphlet.
Dayton Stoner—1 pamphlet.
Texas Game, Fish and Oyster Commission—4 pamphlets.
U. S. Bureau of Biological Survey—2 books.
L. H. Walkinshaw—5 pamphlets, 2 periodicals.
Wisconsin Conservation Department—7 pamphlets.

REPORT OF THE ENDOWMENT FUND COMMITTEE

Total Endowment Fund shown by report dated Nov. 22, 1938:	
Bonds in safety deposit box of Fletcher Trust Co.	$2,261.25
Balance cash in savings account, Fletcher Trust Co., Indianapolis	109.03
Grand total, Nov. 22, 1938	$2,370.28
Received during year 1939:	
Interest coupons on U.S. Postal Savings 2½% coupon bonds due Jan. 1, 1939 and July 1, 1939 and deposited in savings account, St. Anthony Park State Bank	$ 19.50
Interest on savings account in St. Anthony Park State Bank	.82
	$ 20.32
Total Endowment Fund, Nov. 24, 1939:	
Bonds in safety deposit box at St. Anthony Park State Bank (value at maturity, $2,530.00)	$2,261.25
Balance cash in savings account, St. Anthony Park State Bank	129.35
Grand total	$2,390.60

November 24, 1939

Respectfully submitted,

GUSTAV SWANSON, *Chairman*

REPORT OF THE LIBRARIAN FOR THE YEAR ENDING NOVEMBER, 1939

I have the honor to present herewith the ninth annual report of the Librarian of the Wilson Ornithological Club.

As a result of last year's cataloguing of the collection, little work was necessary in administering the library this year. Books were arranged on the shelves so they could be used to the best advantage, and the additions to the library were accessioned as they were received.

The most noticeable addition to the library was the increased number of exchanges. We are now getting regularly 46 publications.

Many valuable gifts continue to come to the library. Large boxes were received from Wendell Taber and Winsor M. Tyler of Cambridge, Massachusetts, Lynds Jones of Oberlin, Ohio, Mrs. Margaret M. Nice of Chicago and W. J. Willis of Long Island, New York. Others who have given pamphlets, reprints and books to the library are A. C. Fox of Fargo, North Dakota, Burt Gresham of Winnipeg, Manitoba, Ralph Beebe of Ecorse, Michigan, Paul A. Stewart of Leetonia, Ohio, Lawrence H. Walkinshaw of Battle Creek, Michigan, Robinson C. Watters of Cambridge, Maryland, Leon Kelso of Washington, D.C., Paul Lechevalier of Paris, France, Leonard Wing of Pullman, Washington, E. L. Sumner, Jr., of Menlo Park, California, Maurice Brooks of Morgantown, West Virginia, Mrs. F. C. Laskey of Nashville Tennessee, Miles D. Pirnie of Battle Creek, Michigan, Francis Harper of Swarthmore, Pennsylvania, Dayton Stoner, Albany, N. Y., Josselyn Van Tyne of Ann Arbor, Michigan, G. J. Wallace of Lenox, Massachusetts, and W. L. McAtee of Washington, D.C.

Among the gifts were runs of many magazines such as *The Oölogist*, *Bluebird*, *British Birds*, *Osprey*, *Guide to Nature*, *American Ornithology*, *Victorian Naturalists*, *Le Naturaliste Canadien*, *The Migrant* and the *Oölogist's Record*. The total number of pieces added to the library exclusive of the periodicals is 872.

The stock of the *Wilson Bulletins* have been arranged for easy accessibility and efficient use.

Respectfully submitted,

F. RIDLEN HARRELL, *Librarian*

November 18, 1939.

REPORT OF THE TREASURER FOR 1939

Receipts for 1939

Balance as shown by last report, Nov. 22, 1938	$ 187.64
Dues:	
Associate	1,062.40
Active	537.75
Sustaining	207.50
Subscriptions	133.49
Sale of back numbers of *The Wilson Bulletin*	239.40
Contributions of authors toward publication	31.00
Gifts	45.00
Miscellaneous receipts	10.70
Total	$2,454.88

Disbursements for 1939

President's expense (postage)	$	3.84
Annual meeting expense (1938, 1939 in part)		161.72
Membership, Ecological Soc. and Illinois Cons. Council		4.00
Book plates		2.65
Secretary's and membership committee expense (postage, supplies, printing, clerical aid)		382.07
Editor's expense, *Bulletin*, postage, supplies		1,586.03
Treasurer's expense, postage, printing, etc.		64.12
Subscription refunds		9.90
Shipping back numbers of *Bulletin* from Sioux City to Ann Arbor		93.69
Checks returned		10.50
Bank charges—Check collection fees, bookkeeping charge, deduction on foreign exchange		36.56
Reprints (for which authors paid W.O.C.)		21.88
Total		$2,376.96
Balance on hand in St. Anthony State Bank, Nov. 22, 1939	$	77.92

Respectfully submitted,

Gustav Swanson, *Treasurer*

November 24, 1939.
Approved by Auditing Committee
Wendell P. Smith
Eugene P. Odum

The Wilson Bulletin Publication Dates

The actual dates of publication of the four numbers in 1939 were: March 31, June 22, September 28, and December 23.

TO OUR CONTRIBUTORS

Our members are asked to submit articles for publication in the *Bulletin*. Manuscripts will be accepted with the understanding that they have not been published or accepted for publication elsewhere.

MANUSCRIPT. Manuscripts should be typed on paper of good quality and of letter size (8½ x 11). Write on one side only and use double spacing. The title should be brief and carefully constructed so as to indicate clearly the subject. Ordinarily the scientific names of the birds treated should be given and should appear early in the article. Most articles should have a brief summary at the end.

ILLUSTRATIONS. Photographic prints, to reproduce well as half-tones, should have good contrast and detail. Please send prints unmounted, and attach to each print a brief but adequate legend. Do not write heavily on the backs of photographs.

BIBLIOGRAPHY. Literature cited should ordinarily be listed at the end of articles. These citations should be complete and references to them in the text should be made by the year of the citation and the exact pages referred to.

PROOF. Galley proof will be submitted to authors and must be returned promptly. Expensive alterations in copy after the type has been set must be charged to the author.

REPRINTS. The Club is unable to furnish free reprints to authors. Arrangements will be made, however, for such reprints to be made at cost. A scale of costs, based on the number of pages, is given below. Orders for reprints should accompany the returned galley proof. Charge will be made for a minimum of 100 reprints.

REPRINT SCHEDULE OF THE WILSON BULLETIN

	1 page	2 pp.	4 pp.	8 pp.	12 pp.	16 pp.	Each Additional 4 pp.
100 copies	$1.95	$2.10	$3.40	$4.15	$5.90	$7.00	85c
Each Additional 100 copies	95c	1.00	1.40	2.20	2.90	3.50	35c

Covers: $3.85 for first 100 copies; $1.40 for additional 100 copies.

ANNUAL MEETINGS OF THE WILSON ORNITHOLOGICAL CLUB

		President
1914—Chicago	February 5	T. C. Stephens
Chicago Academy of Sciences		
1914—Chicago	December 29-30	T. C. Stephens
1915—Columbus	December 28-29	T. C. Stephens
1916—Chicago	December 27-28	T. C. Stephens
1918—Pittsburgh	January 1-2	W. F. Henninger
1919—St. Louis	December 29-30	M. H. Swenk
1920—Chicago	December 27-28	R. M. Strong
1921—Chicago	December 26-27	R. M. Strong
1922—Chicago	October 24	T. L. Hankinson
Field Museum; with A.O.U.		
1923—Cincinnati	Dec. 31-Jan. 1, 1924	T. L. Hankinson
1924—Nashville	November 28-30	A. F. Ganier
Peabody College		
1925—Kansas City	December 28-29	A. F. Ganier
1926—Chicago	November 26-27	A. F. Ganier
Chicago Academy of Sciences		
1927—Nashville	Dec. 30-Jan. 1, 1928	Lynds Jones
1928—Ann Arbor	Nov. 30-Dec. 1	Lynds Jones
University of Michigan		
1929—Des Moines	December 27-28	Lynds Jones
1930—Cleveland	December 29-30	J. W. Stack
1931—New Orleans	December 28-29	J. W. Stack
1932—Columbus	November 25-26	J. M. Shaver
Ohio State Museum		
1934—Pittsburgh	December 28-29	J. M. Shaver
Carnegie Museum		
1935—St. Louis	December 30-31	J. Van Tyne
1936—Chicago	November 27-28	J. Van Tyne
Chicago Academy of Sciences		
1937—Indianapolis	December 27-28	J. Van Tyne
1938—Ann Arbor	November 25-26	M. M. Nice
University of Michigan		
1939—Louisville	November 24-25	M. M. Nice